

# 2015-2016 Air Monitoring Network Plan

City of Philadelphia  
Department of Public Health  
Air Management Services

July 1, 2015

## Executive Summary

Philadelphia has an air monitoring network of twelve air monitoring stations that house instruments that measure ambient levels of gaseous, solid, and liquid aerosol pollutants. It is operated by the City of Philadelphia's Department of Public Health, Air Management Services (AMS), the local air pollution control agency for the City of Philadelphia. This network is part of a broader network of air monitoring operated by our local states of Pennsylvania, New Jersey, Delaware and Maryland that make up the Philadelphia- Camden- Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area (MSA).

The United States Environmental Protection Agency (US EPA) created regulations on how the air monitoring network is to be set up. These regulations can be found in Title 40 - Protection of Environment in the Code of Federal Regulations (CFR) Part 58 – Ambient Air Quality Surveillance, located online at: <http://www.ecfr.gov/cgi-bin/text-idx?SID=86f79e0c1262e76604e10118aa3cc0ec&mc=true&node=pt40.6.58&rgn=div5>.

Beginning July 1, 2007, and each year thereafter, AMS has submitted to EPA Region III, an Air Monitoring Network Plan (Plan) which assures that the network stations continue to meet the criteria established by federal regulations.

Air monitoring provides critical information on the quality of air in Philadelphia. The objective for much of our network is to measure pollutants in areas that represent high levels of contaminants and high population exposure. Some monitoring is also done to determine the difference in pollutant levels in various parts of the City, provide long term trends, help bring facilities into compliance, provide real-time monitoring and provide the public with information on air quality.

Air monitoring data is submitted to the EPA on a quarterly basis. EPA's AirData website (<http://www.epa.gov/airdata/>) provides access to air quality data collected at the monitors. On May 1<sup>st</sup> of the current year, AMS certifies the prior year's data. The annual data certification process is outlined in 40 CFR Part 58.15.

The proper siting of a monitor requires the specification of the monitoring objective, the types of sites necessary to meet the objective, and the desired spatial scale of representativeness. These are discussed in the section entitled "Definitions".

This Plan is composed of fourteen sections plus Appendix A:

- 1. Announcement of Future Changes to the Network** - This section provides information on how the public is made aware of the Plan and where it is available for review.
- 2. Definitions** - This section describes the terms used for air monitoring programs, measurement methods, monitoring objectives, spatial scales, air monitoring areas, pollutants, collection methods, and analysis methods.
- 3. Current Network at a Glance** - This section shows the location of the monitoring sites and the pollutants measured at each site.

- 4. Current Sites Summary** - This section provides information applicable to our overall network such as population. It also provides a brief overall purpose for each monitoring site.
- 5. Direction of Future Air Monitoring** - This section gives a perspective of the major areas and initiatives AMS will be considering during the next few years.
- 6. Potential Changes to the Network** - This section describes changes that may occur within the next 18 months that would modify the network from how it is currently described in the Plan.
- 7. NCore Monitoring Network** - This section documents the NCore monitoring network codified in 40 CFR Part 58.10(a)(3) and 40 CFR Appendix D section 3.
- 8. Pb Monitoring Network** - This section documents the Pb monitoring network codified in 40 CFR Part 58.10(a)(4) and 40 CFR Appendix D section 4.5.
- 9. NO<sub>2</sub> Monitoring Network** - This section documents the NO<sub>2</sub> monitoring network codified in 40 CFR Part 58.10(a)(5) and 40 CFR Appendix D section 4.3.
- 10. SO<sub>2</sub> Monitoring Network** - This section documents the SO<sub>2</sub> monitoring network codified in 40 CFR Part 58.10(a)(6) and 40 CFR Appendix D section 4.4.
- 11. CO Monitoring Network** - This section documents the CO monitoring network codified in 40 CFR Part 58.10(a)(7) and 40 CFR Appendix D section 4.2.
- 12. PM<sub>2.5</sub> Monitoring Network** - This section documents the PM<sub>2.5</sub> monitoring network codified in 40 CFR Part 58.10(a)(8) and 40 CFR Appendix D section 4.7.
- 13. O<sub>3</sub> Monitoring Network** - This section documents the O<sub>3</sub> monitoring network codified in 40 CFR Appendix D section 4.4.
- 14. Detailed Information on Each Site** - This is the largest section of the Plan. Each monitoring site is separately described in a table, complete with pictures and maps. The material is presented as:
  - A table providing information on the pollutants measured, sampling type, operating schedule, collection method, analysis method, spatial scale, monitoring objective, probe height, and begin date of each monitor;
  - Pictures taken at ground level of the monitoring station;
  - A map of the monitoring site complete with major cross streets and major air emission sources within 3000 meters (almost 2 miles); and
  - An aerial picture providing a north view of the site.

## **15. Appendices**

- **Wind Rose Plots** - Appendix A provides wind rose plots from 2006 – 2014.

AMS has provided a copy of the Plan for public inspection on the City's website at:  
<http://www.phila.gov/health/AirManagement/PublicMeetings.html>.

Comments or questions concerning the air monitoring network or this Plan can be directed to:

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## **Announcement of Future Changes to the Network**

Beginning July 1, 2007, and each year thereafter, AMS has submitted to EPA Region III, a Plan assuring that the network stations continue to meet the criteria established by federal regulations. At least 30 days prior to July 1 of each year, AMS announces to the public the availability of the Plan through notices published in the *Philadelphia Daily News* and the *Pennsylvania Bulletin*. Copies of the Plan are available for public inspection on the City's website under the Department of Public Health, Air Management Services at:

<http://www.phila.gov/health/AirManagement/PublicMeetings.html>

and at the AMS office:

Air Management Services  
321 University Avenue, 2nd Floor  
Philadelphia, PA 19104  
Phone – 215-685-7586

Provisions will be made to accommodate comments and questions concerning the air monitoring network or the Plan. If comments are received, they will be considered for incorporation into the Plan.

## Definitions

### Air Monitoring Programs

EPA has established various air monitoring programs for the measurement of pollutants. Some of these are briefly described below. Later in this Plan, air monitoring sites and monitoring equipment are specifically identified relative to these air monitoring programs:

- **NATTS** - National Air Toxics Trends Stations. This network provides ambient levels of hazardous air pollutants. These sites are established with the intent that they will operate over many years and provide both current and historical information.
- **NCore** - National Core multi-pollutant monitoring stations. Monitors at these sites are required to measure particles (PM<sub>2.5</sub>, speciated PM<sub>2.5</sub>, PM<sub>10-2.5</sub>), O<sub>3</sub>, SO<sub>2</sub>, CO, nitrogen oxides (NO/NO<sub>2</sub>/NO<sub>x</sub>), Pb, and basic meteorology. They principally support research in air pollution control.
- **SLAMS** - State or Local Air Monitoring Stations. The SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons, but may serve other data purposes. SLAMS exclude special purpose monitor (SPM) stations and include NCore, PAMS, Near-road NO<sub>2</sub>/CO and all other State or locally operated stations that have not been designated as SPM stations.
- **PAMS** - Photochemical Assessment Monitoring Stations.
- **STN** - A PM<sub>2.5</sub> speciation station designated to be part of the Speciation Trends Network. This network provides chemical species data of fine particulate. These sites are established with the intent that they will operate over many years and provide both current and historical information.
- **State speciation site** - A supplemental PM<sub>2.5</sub> speciation station that is not part of the speciation trends network.
- **SPM** - Special Purpose Monitor. As the name implies these monitors are placed for purposes of interest to the city of Philadelphia. Often this monitoring is performed over a limited amount of time. Data is reported to the federal Air Quality System (AQS) and is not counted when showing compliance with the minimum requirements of the air monitoring regulations for the number and siting of monitors of various types. The agency may designate a monitor as an SPM after January 1, 2007 only if it is a new monitor or for a monitor included in the monitoring plan prior to January 1, 2007, if the Regional Administrator has approved the discontinuation of the monitor as a SLAMS site.

### Measurement Methods

- **Approved Regional Method (ARM)** - A continuous PM<sub>2.5</sub> method that has been approved specifically within a State or Local air monitoring network for purposes of comparison to the NAAQS and to meet other monitoring objectives.
- **Federal Equivalent Method (FEM)** - A method for measuring the concentration of an air pollutant in the ambient air that has been designated as an equivalent method in accordance with 40 CFR Part 53; it does not include a method for which an equivalent method designation has been canceled in accordance with 40 CFR Part 53.11 or 40 CFR Part 53.16.
- **Federal Reference Method (FRM)** - A method of sampling and analyzing the ambient air for an air pollutant that is specified as a reference method in an appendix to 40 CFR

Part 50, or a method that has been designated as a reference method in accordance with this part; it does not include a method for which a reference method designation has been canceled in accordance with 40 CFR Part 53.11 or 40 CFR Part 53.16.

## Monitoring Objectives

The ambient air monitoring networks must be designed to meet three basic monitoring objectives:

- Provide air pollution data to the general public in a timely manner.
- Support compliance with ambient air quality standards and emissions strategy development.
- Assist in the evaluation of regional air quality models used in developing emission strategies, and to track trends in air pollution abatement control measures' impact on improving air quality.

In order to support the air quality management work indicated in the three basic air monitoring objectives, a network must be designed with a variety of different monitoring sites. Monitoring sites must be capable of informing managers about many things including the peak air pollution levels, typical levels in populated areas, air pollution transported into and outside of a city or region, and air pollution levels near specific sources.

## Spatial Scales

The physical siting of the air monitoring station must be consistent with the objectives, site type and the physical location of a particular monitor.

The goal in locating monitors is to correctly match the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for the monitoring site type, air pollutant to be measured, and the monitoring objective.

The spatial scale results from the physical location of the site with respect to the pollutant sources and categories. It estimates the size of the area surrounding the monitoring site that experiences uniform pollutant concentrations. The categories of spatial scale are:

- **Microscale** - Defines concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.
- **Middle scale** - Defines concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.
- **Neighborhood scale** - Defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. The neighborhood and urban scales listed below have the potential to overlap in applications that concern secondarily formed or homogeneously distributed air pollutants.
- **Urban scale** - Defines concentrations within an area of city-like dimensions, on the order of 4 to 50 kilometers. Within a city, the geographic placement of sources may result in there being no single site that can be said to represent air quality on an urban scale.
- **Regional scale** – Defines usually a rural area of reasonably homogeneous geography without large sources, and extends from tens to hundreds of kilometers.
- **National and global scales** – These measurement scales represent concentrations characterizing the nation and the globe as a whole.

## Air Monitoring Area

- **Core-Based Statistical Area (CBSA)** - Defined by the U.S. Office of Management and Budget, as a statistical geographic entity consisting of the county or counties associated with at least one urbanized area/urban cluster of at least a population of 10,000 people, plus adjacent counties having a high degree of social and economic integration.
- **Metropolitan Statistical Area (MSA)** - A Core-Based Statistical Area (CBSA) associated with at least one urbanized area of a population of 50,000 people or more. The central county plus adjacent counties with a high degree of integration comprise the area.

## Pollutants

Air Management Services monitors for a wide range of air pollutants:

- **Criteria Pollutants** are measured to assess if and how well we are meeting the National Ambient Air Quality Standards (NAAQS) that have been set for each of these pollutants. These standards are set to protect the public's health and welfare.
  - **Ozone (O<sub>3</sub>)**
  - **Sulfur Dioxide (SO<sub>2</sub>)**
  - **Carbon Monoxide (CO)**
  - **Nitrogen Dioxide (NO<sub>2</sub>)**
    - NO means nitrogen oxide.
    - NO<sub>x</sub> means oxides of nitrogen and is defined as the sum of the concentrations of NO<sub>2</sub> and NO.
    - NO<sub>y</sub> means the sum of all total *reactive* nitrogen oxides, including NO, NO<sub>2</sub>, and other nitrogen oxides referred to as NO<sub>z</sub>.
  - **Particulate**
    - PM<sub>2.5</sub> means particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
    - PM<sub>10</sub> means particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
    - PM Coarse means particulate matter with an aerodynamic diameter greater than 2.5 micrometers and less than 10 micrometers.
    - Ultrafine Particulate Matter means particulate matter with an aerodynamic diameter less than 0.1 micrometers.
  - **Lead (Pb)**
- **Volatile Organic Compounds (VOC)** - Approximately 57 of these compounds are monitored to assist in understanding the formation of ozone and how to control this pollutant.
- **Toxics** - Approximately 44 compounds, carbonyls – 7 compounds, and metals - 7 elements are toxic and are measured to assess the risk of cancer and non cancer caused by these pollutants.
- **Speciated PM<sub>2.5</sub>** - PM<sub>2.5</sub> particles are analyzed to identify their makeup (60 components including elements, radicals, elemental carbon, and organic carbon) and help assess the level of health risk and identify sources that are contributing to the levels of PM<sub>2.5</sub> being measured.
- **Black Carbon** - Black Carbon is a major component of "soot", a complex and most strongly absorbing component of particulate matter (PM), that is formed by the incomplete combustion of fossil fuels, biofuels, and biomass.
- **BaP** - means Benzo(a)Pyrene, a polycyclic aromatic hydrocarbon that is a product of incomplete combustion or burning organic (carbon-containing) items.

## Collection Methods

### Particulate samples

- **BAM-Beta Attenuation Monitor Met One BAM-1020** - This instrument provides concentration values of particulate each hour. The BAM -1020 uses the principle of beta ray attenuation to provide a simple determination of mass concentration. Beta ray attenuation: A small  $^{14}\text{C}$  element emits a constant source of high-energy electrons, also known as beta particles. These beta particles are efficiently detected by an ultra-sensitive scintillation counter placed nearby. An external pump pulls a measured amount of air through a filter tape. Filter tape, impregnated with ambient dust is placed between the source and the detector thereby causing the attenuation of the measured beta-particle signal. The degree of attenuation of the beta-particle signal may be used to determine the mass concentration of particulate matter on the filter tape and hence the volumetric concentration of particulate matter in ambient air.

**The following instruments provide concentration values of particulate over a 24-hour period. Laboratory analysis is required before the concentration of particulate can be determined.**

- **Hi-Vol** - High-Volume Air Samplers (HVAS) are used to determine the concentration of particulate matter in the air. Without a size-selective inlet (SSI), all collected material is defined as total suspended (in the air) particulates (TSP), including lead (Pb) and other metals. A size-selective inlet is added for  $\text{PM}_{10}$  measurement. A Hi-Volume sampler consists of two basic components: a motor similar to those used in vacuum cleaners and an air flow control system.
- **Hi-Vol-SA/GMW-321-B** - High Volume Sierra Anderson or General Metal Works (GMW) model 321-B  $\text{PM}_{10}$  is a high volume air sampler system which has a selective inlet 203 cm x 254 cm filter.
- **Met One SASS** - Filters used to collect PM measurement of total mass by gravimetry, elements by x-ray fluorescence.
- **R & P  $\text{PM}_{2.5}$**  - Rupprecht & Potashnick  $\text{PM}_{2.5}$  monitors an air sample drawn through a Teflon filter for 24 hours.

### Gaseous / criteria pollutants

- **Instrumental** - Data from these instruments is telemetered to a central computer system and values are available in near “real time”. An analyzer used to measure pollutants such as: carbon monoxide, sulfur dioxide, nitrogen oxides and ozone.

### Toxic and organic (VOC) pollutants

- **SS Canister Pressurized** - Ambient air is collected in stainless-steel canisters, cryogenically concentrated using liquid nitrogen and analyzed for target VOCs and other organic components by GC-FID.
- **Canister Sub Ambient Pressure** - Collection of ambient air into an evacuated canister with a final canister pressure below atmospheric pressure.
- **DNPH-Coated Cartridges** - Cartridges are coated with 2,4-dinitrophenylhydrazine (DNPH). This is used for carbonyl determination in ambient air. High Performance Liquid Chromatography (HPLC) measures the carbonyl.

## Analysis Methods

### Particulate concentration

- **Gravimetric** - The determination of the quantities of the constituents of a compound, describes a set of methods for the quantitative determination of an analyte based on the weight of a solid. Laboratory analysis is needed.

- **BAM-Beta Attenuation** - The principle of beta ray attenuation to provide a simple determination of mass concentration. Instrumental – data is available in near real time.

#### **Composition/make-up of particulates**

- **Atomic Absorption** - This analysis measures the intensity of radiation of a specific wavelength that is absorbed by an atomic vapor.
- **Energy Dispersive XRF** - Energy dispersive x-Ray Fluorescence Spectrometer for the determination of metals including Lead concentration in ambient particulate matter. The method is collected on PM<sub>2.5</sub> filter samples.

#### **Gaseous / criteria pollutants**

- **Nitrogen Oxides – Chemiluminescence** - Emission of light as a result of a chemical reaction at environmental temperatures. This analysis is used for NO, NO<sub>x</sub>, and NO<sub>y</sub>. NO<sub>2</sub> is calculated as NO<sub>x</sub> - NO.
- **Carbon Monoxide - Nondispersive infrared** - A nondispersive infrared (NDIR) gas analyzer is an instrument that measures air samples for CO content.
- **Sulfur Dioxide - Pulsed Fluorescent** - Pulsed fluorescence sulfur dioxide monitor where air is drawn from the outside and passes through the analysis cell, and a high intensity burst of UV light is emitted. The sulfur dioxide responds to the specific UV wavelength generated by absorbing the energy. When the flash lamp shuts off (in a fraction of a second) the SO<sub>2</sub> fluoresces giving off an amount of photons directly proportional to the concentration of sulfur dioxide in the air.
- **Ozone - Ultra Violet** - A light, which supplies energy to a molecule being analyzed. Ozone is analyzed with UV.

#### **Toxic and volatile organic pollutants**

- **Cryogenic Preconcentration GC/FID** - Cryogenic Preconcentration Gas Chromatograph/Flame Ionization Detector - air injection volume for capillary GC combined with low concentrations of analyte require that samples be preconcentrated prior to GC analysis. Sample preconcentration is accomplished by passing a known volume of the air sample through a trap filled with fine glass beads that is cooled to -180°C. With this technique, the volatile hydrocarbons of interest are quantitatively retained in the trap, whereas the bulk constituents of air (nitrogen, oxygen, etc.) are not. The air sample is collected in a vessel of known volume. A portion of this volume is analyzed and used to calculate concentration of each compound in the original air sample after Gas Chromatographic (Flame Ionization Detector, GC-FID) analysis. The sample trapped cryogenically on the glass beads is thermally desorbed into a stream of ultra-pure helium and re-trapped on the surface of a fine stainless steel capillary cooled to -180°C. This second cryogenic trapping stage "focuses" the sample into a small linear section of tubing. The cold stainless steel capillary is ballistically heated (by electrical resistance) and the focused sample quickly desorbs into the helium stream and is transferred to the chromatographic column. Cryogen (liquid nitrogen, LN<sub>2</sub>) is used to obtain sub ambient temperatures in the VOC concentration and GC. This analysis is used to determine the concentration of Benzene and other organic compounds and VOC in the atmosphere.
- **GC/MS** - Gas Chromatograph/Mass Spectrometer. Analysis of organic or VOC are conducted using a gas chromatograph (GC) with a mass spectrometer (MS) attached as the detector. Cryogenic preconcentration with liquid nitrogen (LN<sub>2</sub>) is also used to trap and concentrate sample components.
- **Thin Layer Chromatography (TLC)** - TLC is a widely used chromatography technique used to separate chemical compounds. It involves a stationary phase consisting of a thin layer of adsorbent material, usually silica gel, aluminum oxide, or cellulose immobilized onto a flat, inert carrier sheet.



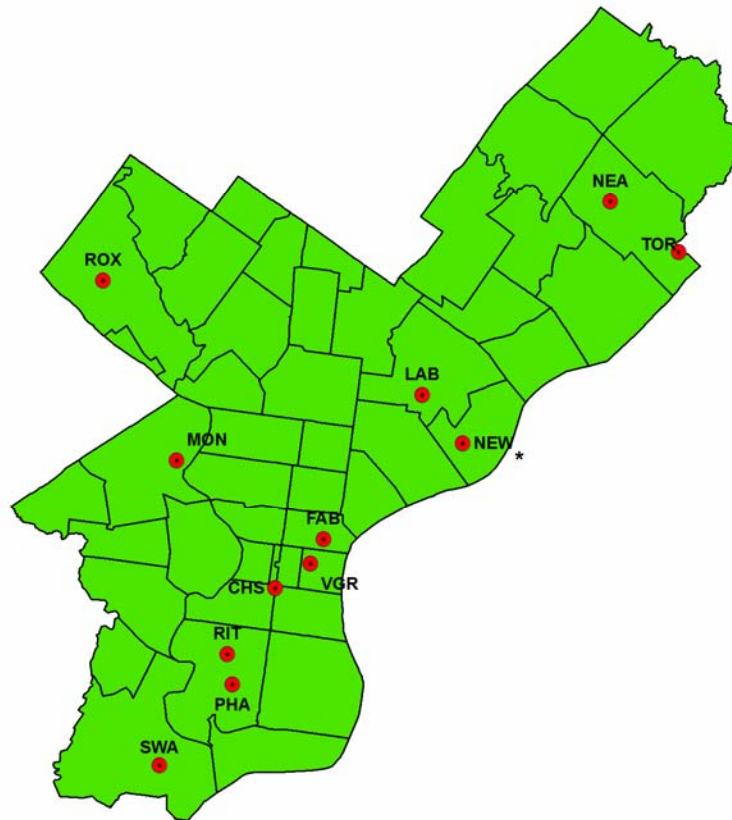
- **High Pressure Liquid Chromatography (HPLC).** The analytical method used to analyze carbonyl compounds such as acetaldehyde and formaldehyde. Carbonyl compounds are collected on the sampling media as their 2,4-dinitrohydrazine derivatives. The derivatives are separated by liquid chromatography (LC) on a packed column by means of a solvent mixture under high pressure (HPLC) followed by UV detection of each carbonyl derivative.

## Current Network at a Glance

The City of Philadelphia is served by a network of twelve air monitoring sites located throughout the City that measure the criteria pollutants: ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and lead (Pb). Five of the sites also measure toxics, such as benzene, acetaldehyde, and formaldehyde. The map below shows the location of air monitors and the pollutants measured at each monitor location.

Figure 1 - 2015 Philadelphia Air Monitoring Network as of July 1, 2015

### 2015 PHILADELPHIA AIR MONITORING NETWORK



\* NCore

AQ5 Site Code	AMS Site	Address	Parameter															TSP Metals (Be, Cr, Mn, Ni, As, Cd, Pb)	TSP Lead (14129)	Toxics TO15	MET	Comm. Air Toxics OPEN PATH	AMS Site
			CO	SO <sub>2</sub>	Ozone	NO <sub>2</sub>	NOy/NO	PM <sub>10</sub>	PM <sub>2.5</sub>	Speciated PM <sub>2.5</sub>	PM Coarse	Carbonyls	PAMS VOC	TSP (11101)									
421010004	LAB	1501 E. Lycoming	X		X	X	X		X			X	X		X			X		X			LAB
421010014	ROX	Eva & Deamley										X			X				X				ROX
421010024	NEA	Grant & Ashton			X																		NEA
421010047	CHS**	500 S. Broad				X			X			X			X			X		X			CHS
421010048	NEW	3900 Richmond	X	X	X		X	X	X	X	X			X		X		X		X	X		NEW
421010055	RIT	24th & Ritner		X					X	X		X			X			X		X	X		RIT
421010057	FAB	3rd & Spring Garden							X														FAB
421010063	SWA	8200 Enterprise										X			X			X		X			SWA
421010075	TOR	4900 Grant	X			X			X											X			TOR
421010076	MON**	I-76 & Montgomery				X			X					X						X			MON
	PHA	3100 Penrose Ferry																			X		PHA
	VGR	6th & Arch			X				X											X			VGR

\*\* CHS: PM<sub>2.5</sub> and NO<sub>2</sub> to be shut down 7/1/15. All other pollutants to be shut down 1/1/16.

\*\* MON: Operational 7/1/15.

## Summary of Current Sites

All of our twelve monitoring sites are located in Philadelphia, PA:

State: Pennsylvania

City: Philadelphia

County: Philadelphia

Metropolitan Statistical Area (MSA): Philadelphia – Camden - Wilmington, PA-NJ-DE-MD

MSA number: 37980

Population: 6,051,170 (2014 annual estimate)<sup>1</sup>

EPA Region: III, Philadelphia

Class I area: Brigantine Natural Wildlife Preserve near Atlantic City, NJ

City population: 1,560,297 (2014 annual estimate)<sup>2</sup>

Time zone: EST

UTM zone: 18

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<sup>1</sup> MSA population estimates from:

<http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

<sup>2</sup> Philadelphia County population estimates from: <http://quickfacts.census.gov/qfd/states/42/42101.html>

**Table 1 - Site Summary Table**

<b>AQS Site Code</b>	<b>AMS Site</b>	<b>Address</b>	<b>Statement of Purpose</b>
<b>421010004</b>	<b>LAB</b>	1501 E. Lycoming St.	Built in 1964, a good site for the assessment of the City's impact on precursors to the formation of ozone and is a designated PAMS site. It is a good site to test new or complex monitoring methods as laboratory staff are readily available.
<b>421010014</b>	<b>ROX</b>	Fowler & Dearnley Sts.	Periphery site.
<b>421010024</b>	<b>NEA</b>	Grant Ave & Ashton Rd.	Periphery site. High Ozone.
<b>421010047</b>	<b>CHS</b>	500 S. Broad St.	Traffic related, a site that indicates the impact of street traffic and pollutants that are transported into Center City.
<b>421010048</b>	<b>NEW</b>	2861 Lewis St.	Originally sited to measure the impact of Franklin Smelting and Refining (now closed), MDC (now closed), and the waste water treatment plant. In 2013, the NCore site was re-located here.
<b>421010055</b>	<b>RIT</b>	24 <sup>th</sup> & Ritner Sts.	This site was selected to help assess the impact of the petroleum refinery on the local community. The area was identified by air quality modeling.
<b>421010057</b>	<b>FAB</b>	3 <sup>rd</sup> & Spring Garden Sts.	This site was established to represent the highest levels of PM <sub>2.5</sub> in the City based on EPA Region III's air quality modeling of air toxics in Philadelphia. It shows high levels of PM <sub>2.5</sub> created by vehicle traffic.
<b>421010063</b>	<b>SWA</b>	8200 Enterprise Ave.	This site was established to measure toxics, carbonyls, and metals. EPA Region III modeling analysis showed areas near the airport to have high levels of aldehydes.
<b>421010075</b>	<b>TOR</b>	4901 Grant Ave & James St.	This site was established as the 1 <sup>st</sup> near-road NO <sub>2</sub> monitor in the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area .
<b>421010076</b>	<b>MON</b>	I-76 & Montgomery Drive	This site was established as the 2nd near-road monitor in the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area.
	<b>PHA</b>	3100 Penrose Ferry Road	This site was selected as a Community Scale Air Toxics Monitoring to continuously monitor air toxics pollutants such as benzene and hydrogen fluoride (HF) in the South Philadelphia community.
	<b>VGR</b>	6 <sup>th</sup> & Arch Sts.	EPA's Village Green Air Monitoring Station. Utilizes solar and wind turbine power as energy sources. Sited to increase community awareness of environmental conditions.

## Direction of Future Air Monitoring

The agency will study and assess the overall monitoring program within the City to determine the course of future changes to the air monitoring network.

The agency will focus on the following:

- Maximize the monitoring network to be more efficient (i.e., utilizing continuous equipment to replace filter based equipment, downsize monitoring to reduce overlapping, etc)
  - The agency will continue to utilize PM<sub>2.5</sub> FEMs as replacements for FRMs. All PM<sub>2.5</sub> monitoring sites, except LAB, has utilized PM<sub>2.5</sub> FEMs as their primary PM<sub>2.5</sub> monitors.
  - The agency will re-evaluate the number and monitoring locations for toxics due to decreased EPA funding.
- Improve the understanding of particulate and air toxic pollutants in Philadelphia.
  - The agency plans to pursue negotiations with the port entities in order to implement monitoring and emission inventory efforts in this location.
- Utilize funds from EPA grants to expand the monitoring network.
  - The agency received funding from the EPA (Community Scale Air Toxics Monitoring grant) to install and evaluate a continuous monitor for air toxics in South Philadelphia. This project is ongoing.
  - The agency was awarded a grant to install a second near-road monitor at I-76 and Montgomery Drive (MON). This monitor is expected to be operating by July 1, 2015.
  - EPA selected Philadelphia as one of five recipients in the country for the Village Green Air Monitoring Station Grant Award, to increase community awareness of environmental conditions. The station utilizes solar and wind turbine power as its primary energy source.

## Proposed Changes to the Network

Below are changes that are anticipated to occur over the next 18 months to the existing air monitoring network:

- Calendar year 2015 – June 2016
  - CHS
    - Shut down PM<sub>2.5</sub> monitor as of July 1, 2015. Based on EPA Region III modeling results, FAB was established as an alternative site to CHS.
    - Shut down NO<sub>2</sub> monitor as of July 1, 2015.
    - Shut down all remaining monitors (Carbonyls, TSP metals, and toxics) as of January 1, 2016.
  - Establish and operate a 2<sup>nd</sup> Near-road NO<sub>2</sub> monitor (MON) by July 1, 2015.
    - Monitor NO<sub>2</sub>, PM<sub>2.5</sub>, ultrafine PM<sub>2.5</sub>, TSP, BaP, Black Carbon, and meteorological data.
  - AMS plans to establish a monitoring site (PAC) near the Port of Philadelphia.
    - A monitor to measure PM<sub>2.5</sub>, PM<sub>10</sub>, toxics, carbonyls, and metals will be placed to assess the river port.
    - When the PAC site is established:
      - Toxics, carbonyls, and metals will no longer be monitored at ROX and will be moved to PAC.
  - Village Green monitor
    - EPA picked Philadelphia as one of five recipients in the country for the Village Green Air Monitoring Station Grant Award, to increase community awareness of environmental conditions. The station will measure PM<sub>2.5</sub> and ozone, as well as local wind speed, wind direction, temperature, and humidity, and utilize solar and wind turbine power. The monitor was installed on March 5, 2015 at 6th and Arch Streets across from the Constitution Center. The anticipated start date is April 2015.

## **NCore Monitoring Network**

The requirements for the NCore air monitoring network are codified in 40 CFR Part 58.10(a)(3) and 40 CFR Part 58 Appendix D section 3.

The NCore station is located at NEW.

## **Pb Monitoring Network**

The requirements for the Pb air monitoring network are codified in 40 CFR Part 58.10(a)(4) and 40 CFR Part 58 Appendix D section 4.5.

Philadelphia County has no source oriented Pb sources that emit 0.50 or more tons per year.



## **NO<sub>2</sub> Monitoring Network**

The requirements for the NO<sub>2</sub> air monitoring network are codified in 40 CFR Part 58.10(a)(5) and 40 CFR Part 58 Appendix D section 4.3.

AMS currently operates an NO<sub>2</sub> monitor that meets the area-wide monitoring requirements. The first near-road NO<sub>2</sub> monitor was established at TOR and started operation on January 1, 2014. The second near-road NO<sub>2</sub> monitor is located at MON. Construction at MON began in November 2014, including tree removal and excavation for the concrete padding, with an operational date of July 1, 2015.

## **SO<sub>2</sub> Monitoring Network**

The requirements for the SO<sub>2</sub> air monitoring network are codified in 40 CFR Part 58.10(a)(6) and 40 CFR Part 58 Appendix D section 4.4.

Based on the PWEI, two monitors are required for the Philadelphia-Camden-Wilmington, PA-NJDE-MD CBSA. There are two NCore monitors in the Philadelphia CBSA that meet the monitoring requirements. Philadelphia County currently operates two SO<sub>2</sub> monitors.

## **CO Monitoring Network**

The requirements for the CO air monitoring network are codified in 40 CFR Part 58.10(a)(7) and 40 CFR Part 58 Appendix D section 4.2.

The Philadelphia-Camden-Wilmington, PA-NJ-DE-MD CBSA has a CO monitor collocated with the near-road NO<sub>2</sub> monitor at TOR and has been operational since January 1, 2014.

## **PM<sub>2.5</sub> Monitoring Network**

The requirements for the PM<sub>2.5</sub> air monitoring network are codified in 40 CFR Part 58.10(a)(8) and 40 CFR Part 58 Appendix D section 4.7.

The requirement for at least one PM<sub>2.5</sub> monitor to be collocated at a near-road NO<sub>2</sub> station for CBSAs with a population of 1,000,000 or more persons is met at the TOR monitoring site.

## **O<sub>3</sub> Monitoring Network**

The requirements for the O<sub>3</sub> air monitoring network are codified in 40 CFR Part 58 Appendix D section 4.1.

AMS currently operates three O<sub>3</sub> monitors.

## **Detailed Information on Each Site**

**Table 2 - Detailed LAB Information with Monitoring Station Picture**

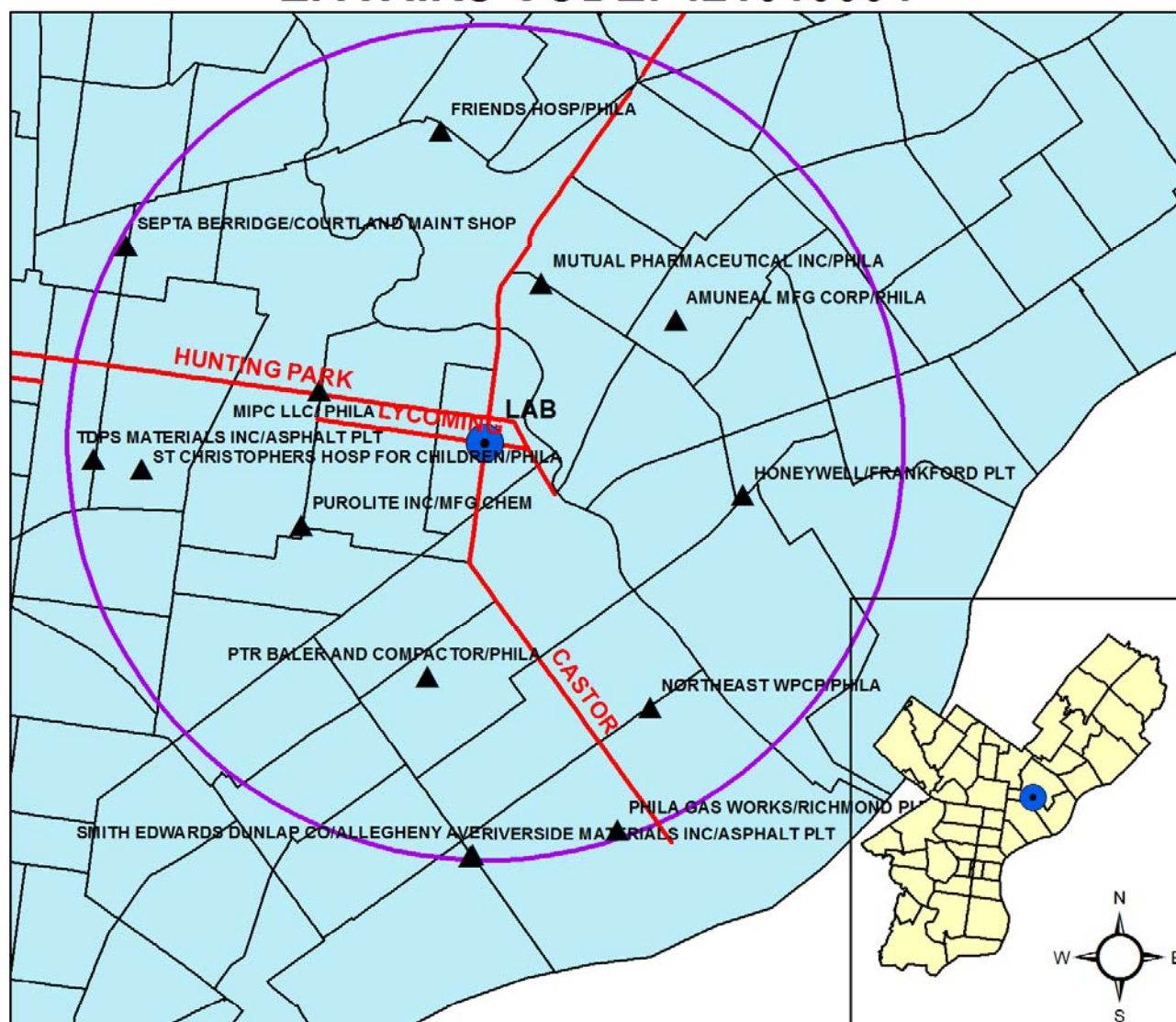
AMS SITE ID: LAB  
 AQS Site ID: 421010004  
 Street Address: 1501 E. Lycoming Street, 19124  
 Geographical Coordinates  
 Latitude: 40.008889  
 Longitude: -75.09778



PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
CO	SLAMS	Continuous	Instrumental	Nondispersive infrared		42101	1	093	Neighborhood	Population Exposure	7	2/1/1966
Ozone	PAMS	Continuous	Instrumental	Ultra Violet	Year-round operation	44201	1	87	Neighborhood	Population Exposure	7	1/1/1974
NO2	SLAMS, PAMS	Continuous	Instrumental	Chemiluminescence		42602	3	99	Urban	Population Exposure	7	1/1/1977
NOy	SLAMS	Continuous	Low Level Nox Instrumental	TECO 42S Chemiluminescence		42600	1	599	Neighborhood	Population Exposure	7	1/1/1997
NOx	SLAMS	Continuous	Instrumental	Chemiluminescence		42603	2	99	Urban	Other	7	1/1/2014
NO	SLAMS	Continuous	Instrumental	Chemiluminescence		42601	2	99	Urban	Other	7	1/1/2014
PM2.5 FRM	SLAMS	1/3 days	R&P PM2.5	Gravimetric		88101	1	145	Neighborhood	Population Exposure	7	7/1/2014
PM2.5 FRM	SLAMS	1/3 days	R&P PM2.5	Gravimetric		88101	2	145	Neighborhood	Highest Concentration	7	1/1/2011
PAMS VOC	PAMS, 24 hr Real Time	1/6 days (April, May, Sept, and Oct)	SS Canister Pressurized	Cryogenic Preconcentration GC/FID		Vary	2	101	Neighborhood	Highest Concentration	7	Vary
	PAMS, 24-hr Colocated	1/6 days (April-Oct)	SS Canister Pressurized	Cryogenic Preconcentration GC/FID		Vary	5	101	Neighborhood	Highest Concentration	7	Vary
	PAMS, 3-hr RealTime	Daily from June-Aug, with sample every 3 hrs	SS Canister Pressurized	Cryogenic Preconcentration GC/FID	continuous PAMS 3 hr, samples during summer	Vary	1	101	Neighborhood	Highest Concentration	7	Vary
	PAMS, 3-hr Colocated	1/6 days (Jun -Aug)	SS Canister Pressurized	Cryogenic Preconcentration GC/FID		Vary	4	101	Neighborhood	Highest Concentration	7	Vary
Carbonyls	Urban Air Toxics	1/6 days	DNPH-Coated Cartridges	HPLC	sampled for four 3-hour periods every 3rd day during PAMS season	Vary	2	102	Neighborhood	Highest Concentration	7	Vary
Toxics	Urban Air Toxics	1/6 days	Canister Subambient Pressure	Multi-Detector GC		Vary	3	150	Neighborhood	Highest Concentration	7	Vary
Metals	SLAMS	1/6 days	Hi-Vol	ICP-MS	Analysis by WV (TSP sampler with quartz)	Vary	1	89	Neighborhood	Other	7	Vary

Figure 2 - LAB Monitoring Site Map with Major Streets and Major Emission Sources

## AMS LABORATORY - 1501 E. LYCOMING ST. EPA AIRS CODE: 421010004



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210101416	TDCS MATERIALS INC/ASPHALT PLT	3870 N 2ND ST	4.78	0.95	0.00	1.09	0.17	0.12	1.16
4210101421	RIVERSIDE MATERIALS INC/ASPHALT PLT	2870 E ALLEGHENY AVE	10.72	2.17	0.00	1.59	0.49	0.28	3.93
4210101551	HONEYWELL/FRANKFORD PLT	4700 BERMUDA ST	66.49	198.93	0.00	68.67	54.77	25.57	112.24
4210101617	PUROLITE INC/MFG CHEM	3620 G ST	2.26	2.71	0.00	0.21	0.21	0.14	3.81
4210102255	SMITH EDWARDS DUNLAP CO/ALLEGHENY AVE	2867 E ALLEGHENY AVE	0.13	0.17	0.00	0.00	0.00	0.07	3.68
4210102258	MUTUAL PHARMACEUTICAL INC/PHILA	1100 ORTHODOX ST	1.05	1.26	0.00	0.09	0.02	0.01	3.45
4210103506	PTR BALER AND COMPACTOR/PHILA	2207 E ONTARIO ST	0.02	0.09	0.00	0.01	0.01	0.00	22.66
4210104172	SEPTA BERRIDGE/COURTLAND MAINT SHOP	200 W WYOMING AVE	1.41	3.04	0.00	3.32	3.32	0.02	4.63
4210104922	PHILA GAS WORKS/RICHMOND PLT	3100 E VENANGO ST	2.38	5.13	0.00	0.22	0.18	0.02	0.18
4210105004	MIPC LLC/ PHILA	4210 G ST	0.00	0.00	0.00	0.00	0.00	0.00	7.00
4210108031	FRIENDS HOSP/PHILA	4641 ROOSEVELT BLVD	2.08	2.52	0.00	0.08	0.00	0.02	0.14
4210108576	ST CHRISTOPHERS HOSP FOR CHILDREN/PHILA	ERIE AVE & FRONT ST	1.87	2.71	0.00	0.20	0.00	0.06	0.17
4210109513	NORTHEAST WPCB/PHILA	3899 RICHMOND ST	26.40	5.45	0.00	1.58	1.58	5.52	12.09
4210110034	AMUNEAL MFG CORP/PHILA	4737 DARRAH ST	0.00	0.00	0.00	0.00	0.00	0.00	0.22
TOTAL			119.59	225.13	0.00	77.06	60.75	31.82	175.35



Figure 3 - LAB North Aerial View



**Table 3 - Detailed ROX Information with Monitoring Station Picture**

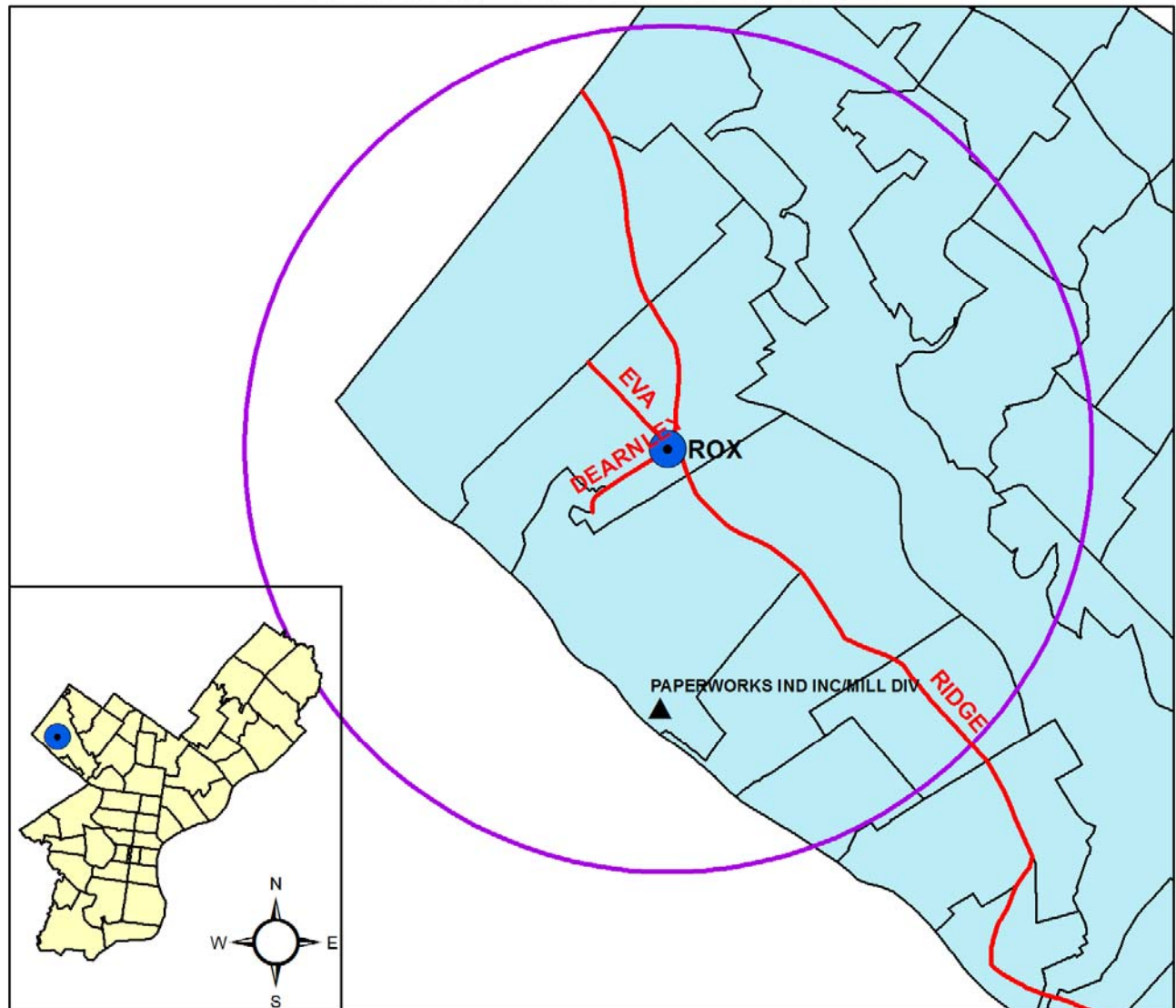
AMS SITE ID: ROX  
 AQS Site ID: 421010014  
 Street Address: Fowler & Dearnley Streets  
 Geographical Coordinates  
 Latitude: 40.050000  
 Longitude: -75.240556



PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
Metals	SLAMS	1/6 days	Hi-Vol	ICP-MS	Analysis by WV (TSP sampler with quartz)	Vary	1	89	Neighborhood	Other	7	Vary
Carbonyls	Urban Air Toxics	1/6 days	DNPH-Coated Cartridges	HPLC		Vary	1	102	Neighborhood	Highest Concentration	7	5/7/2003
Toxics	Urban Air Toxics	1/6 days	Canister Subambient Pressure	Multi-Detector GC		Vary	4	150	Neighborhood	Highest Concentration	7	Vary

Figure 4 - ROX Monitoring Site Map with Major Streets and Major Emission Sources

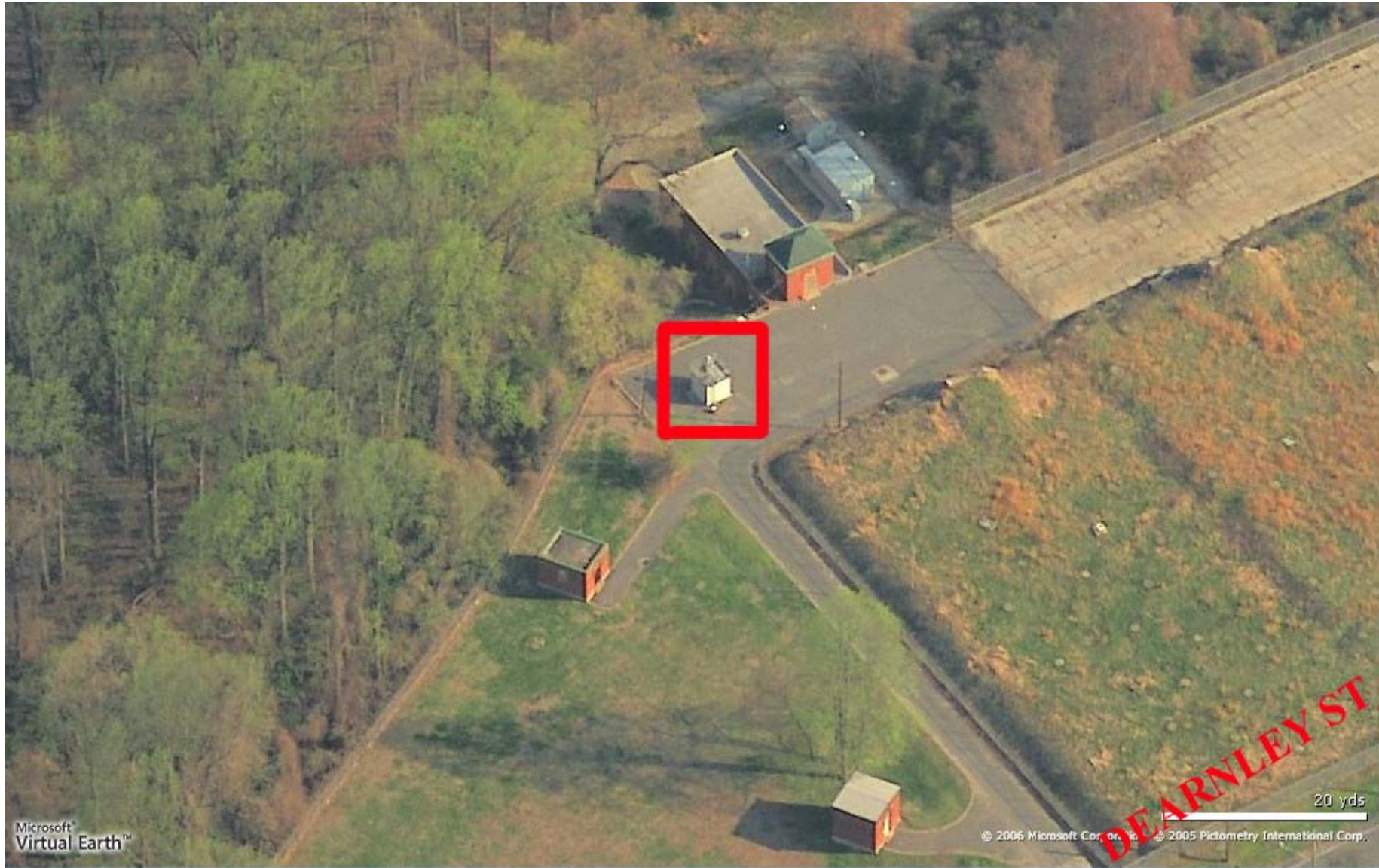
## ROXBOROUGH - EVA & DEARNLEY STS. EPA AIRS CODE: 421010014



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210101566	PAPERWORKS IND INC/MILL DIV	5000 FLAT ROCK RD	45.34	131.72	0.56	4.16	4.15	0.28	16.11
TOTAL			46.34	131.72	0.66	4.16	4.15	0.28	16.11



Figure 5 - ROX North Aerial View



**Table 4 - Detailed NEA Information with Monitoring Station Picture**

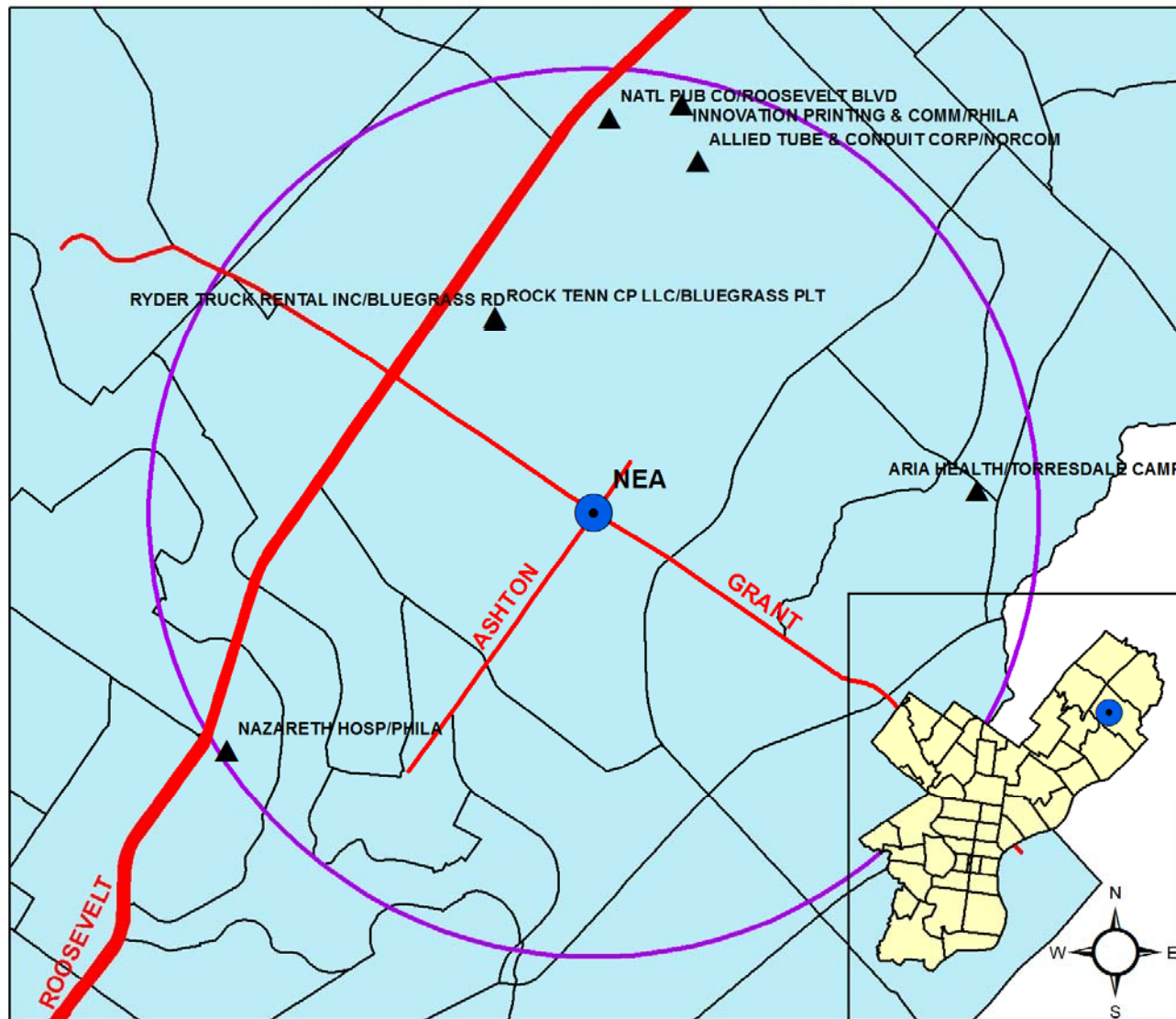
AMS SITE ID: NEA  
 AQS Site ID: 421010024  
 Street Address: Grant & Ashton Roads Phila NE Airport  
 Geographical Coordinates  
 Latitude: 40.076389  
 Longitude: -75.011944



PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
Ozone	SLAMS	Continuous	Instrumental	Ultra Violet	Run year-round	44201	1	87	Neighborhood	Highest concentration	6	1/1/1974
MET	SLAMS	Continuous		Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure, rainfall and solar radiation		Vary	1	Vary	N/A	Unknown	Vary	6/1/1993

Figure 6 - NEA Monitoring Site Map with Major Streets and Major Emission Sources

# **NORTHEAST AIRPORT - GRANT & ASHTON AVES.** **EPA AIRS CODE: 421010024**



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210102030	RYDER TRUCK RENTAL INC/BUEGRASS RD	9751 BLUE GRASS RD	0.02	0.08	0.00	0.08	0.08	0.00	1.75
4210102159	ROCK TENN CP LLC/BUEGRASS PLT	9820 BLUE GRASS RD	0.32	0.34	0.00	0.00	0.00	0.00	0.00
4210103363	ALLIED TUBE & CONDUIT CORP/NORCOM	11350 NORCOM RD	0.48	0.57	0.00	0.24	0.04	0.00	55.71
4210103846	NATL PUB CO/ROOSEVELT BLVD	11311 ROOSEVELT BLVD	0.67	0.80	0.00	0.02	0.02	0.00	2.66
4210108008	NAZARETH HOSP/PHILA	2601 HOLME AVE	2.44	3.35	0.00	0.12	0.00	0.05	0.18
4210108076	ARIA HEALTH/TORRESDALE CAMP	RED LION & KNIGHTS RD	2.50	4.85	0.00	0.35	0.35	0.13	0.33
4210110076	INNOVATION PRINTING & COMM/PHILA	11601 CAROLINE RD	0.05	0.06	0.00	0.00	0.00	0.00	1.06
TOTAL			6.48	10.05	0.00	0.82	0.50	0.19	61.69



Figure 7 - NEA North Aerial View



**Table 5 - Detailed CHS Information with Monitoring Station Picture**

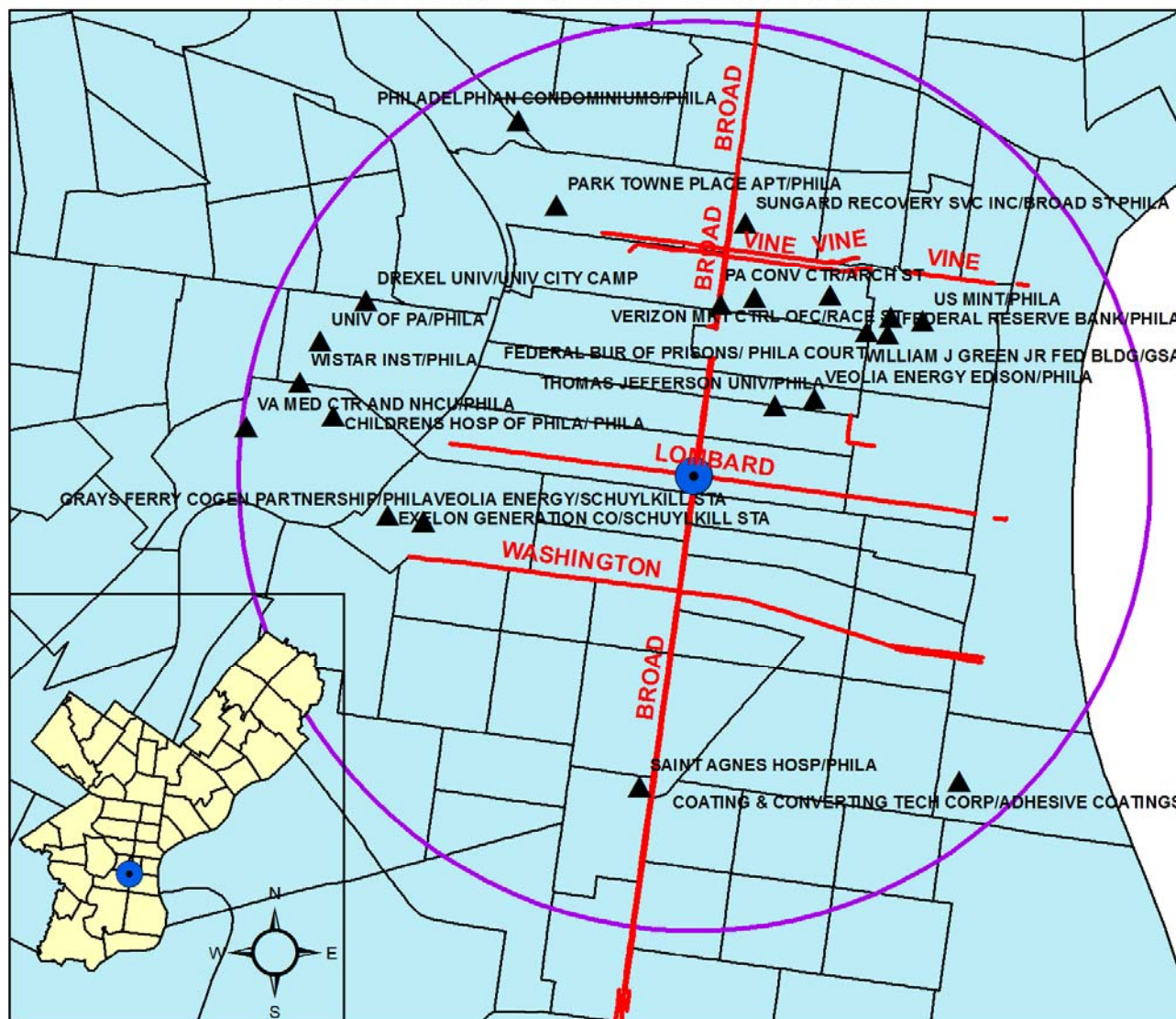
AMS SITE ID: CHS  
 AQS Site ID: 421010047  
 Street Address: 500 S. Broad St  
 Geographical Coordinates  
 Latitude: 39.944722  
 Longitude: -75.166111

PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
NO2	SLAMS	Continuous	Instrumental	Chemiluminescence	Will be shutdown effective 7/1/2015	42602	1	99	Neighborhood	Population Exposure	11	1/1/1982
Metals	SLAMS	1/6 days	Hi-Vol	ICP-MS	Analysis by WV (TSP sampler with quartz); will cease its operation on 12/31/15	Vary	1	89	Microscale	Other	4	1/1/2004
Carbonyls	Urban Air Toxics	1/6 days	DNPH-Coated Cartridges	HPLC	Will cease its operation on 12/31/15	Vary	1	102	Neighborhood	Highest Concentration	7	5/8/2003
Toxics	Urban Air Toxics	1/6 days	Canister Subambient Pressure	Multi-Detector GC	Will cease its operation on 12/31/15	Vary	4	150	Neighborhood	Highest Concentration	7	5/9/2003
PM2.5 Continuous	SLAMS	Continuous	Instrumental	BAM =Beta Attenuation Monitor Met One BAM - 1020	Will be shutdown effective 7/1/2015	88101	3	170	Middle Scale	Highest Concentration	4	4/1/2013



Figure 8 - CHS Monitoring Site Map with Major Streets and Major Emission Sources

# **COMMUNITY HEALTH CENTER #1 - 500 S. BROAD ST.** **EPA AIRS CODE: 421010047**



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210103321	SUNGARD RECOVERY SVC INC/BROAD ST PHILA	401 N BROAD ST STE 600	0.03	0.06	0.00	0.00	0.00	0.02	0.01
4210104902	VEOLIA ENERGY EDISON/PHILA	908 SANSOM ST	0.61	5.93	0.00	2.81	1.27	9.43	0.05
4210104904	EXELON GENERATION CO/SCHUYLKILL STA	2800 CHRISTIAN ST	0.77	5.21	0.00	0.31	0.03	0.01	0.03
4210104942	VEOLIA ENERGY/SCHUYLKILL STA	2600 CHRISTIAN ST	0.62	11.80	0.00	0.48	0.48	1.50	0.18
4210104944	GRAYS FERRY COGEN PARTNERSHIP/PHILA	2600 CHRISTIAN ST	4.28	230.50	0.00	23.41	23.41	5.55	8.36
4210106020	FEDERAL RESERVE BANK/PHILA	100 N 6TH ST	5.43	10.50	0.00	0.77	0.77	0.38	0.57
4210106512	PHILADELPHIAN CONDOMINIUMS/PHILA	2401 PENNSYLVANIA AVE	1.48	1.77	0.00	0.05	0.05	0.03	0.10
4210108526	PARK TOWNE PLACE APT/PHILA	2200 BENJAMIN FRANKLIN PKWY	1.89	2.25	0.00	0.07	0.04	0.01	0.12
4210108016	SAINT AGNES HOSP/PHILA	1930 S BROAD ST	1.65	2.27	0.00	0.09	0.00	0.04	0.12
4210108069	CHILDRENS HOSP OF PHILA/ PHILA	34TH & CIVIC CENTER BLVD	25.11	26.45	0.00	2.24	2.24	0.79	2.56
4210108901	THOMAS JEFFERSON UNIV/PHILA	11 & WALNUT ST	0.38	1.77	0.00	0.12	0.12	0.12	0.09
4210108902	DREXEL UNIV/UNIV CITY CAMP	3330 MARKET ST	1.84	3.10	0.00	0.13	0.00	0.07	0.17
4210108912	UNIV OF PA/PHILA	3451 WALNUT ST	1.77	6.43	0.00	0.43	0.00	0.38	0.34
4210108927	WISTAR INST/PHILA	3601 SPRUCE ST	0.06	0.34	0.00	0.01	0.00	0.01	0.02
4210109703	US MINT/PHILA	151 N INDEPENDENCE MALL E	2.31	1.36	0.00	0.10	0.10	0.01	0.86
4210109705	VA MED CTR AND NHC/PHILA	3900 WOODLAND AVE	7.16	12.64	0.00	1.13	0.00	3.23	0.83
4210109723	WILLIAM J GREEN JR FED BLDG/GSA	600 ARCH ST	1.84	2.34	0.00	0.07	0.07	0.02	0.12
4210109726	FEDERAL BUR OF PRISONS/ PHILA COURT	700 ARCH ST	1.34	1.67	0.01	0.05	0.00	0.02	0.09
4210110092	PA CONV CTR/ARCH ST	1101 ARCH ST	2.46	3.42	0.03	0.14	0.14	0.06	0.85
4210110353	PA CONVENTION CTR ANNEX/BROAD ST	111 N BROAD ST	0.85	1.58	0.05	0.08	0.08	0.06	0.09
4210110114	COATING & CONVERTING TECH CORP/ADHESIVE COATINGS	80 E MORRIS ST	0.23	0.27	0.00	0.02	0.02	0.00	15.73
TOTAL			62.11	331.65	0.10	32.52	28.84	21.74	31.10



Figure 9 - CHS North Aerial View



**Table 6 - Detailed NEW Information with Monitoring Station Picture**

AMS SITE ID: NEW  
 AQS Site ID: 421010048  
 Street Address: 2861 Lewis Street  
 Geographical Coordinates  
 Latitude: 39.991389  
 Longitude: -75.080833

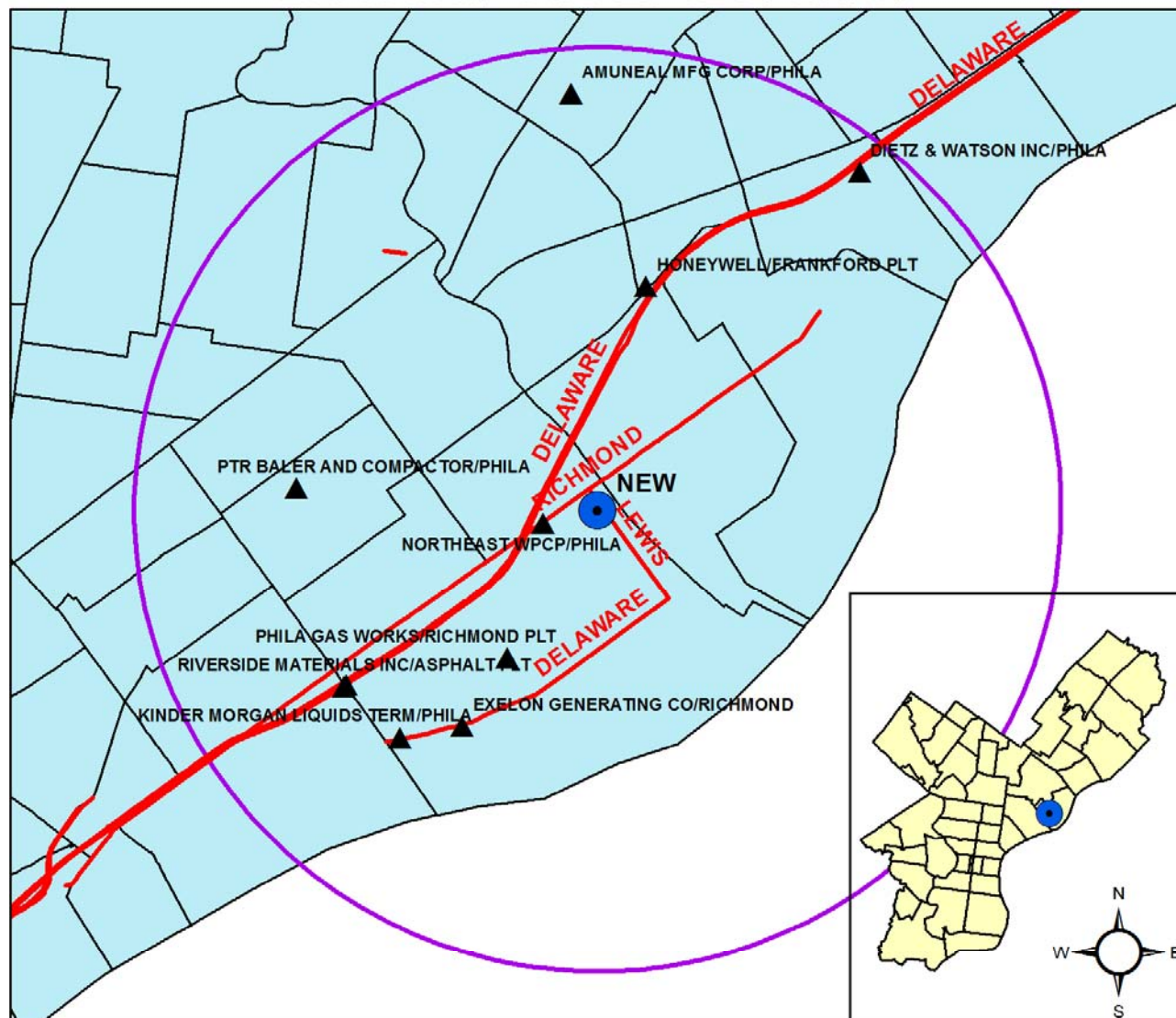


PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
CO (trace)	Ncore	Continuous	Instrumental	ARM utilizing trace level Non-dispersive infrared	High sensitivity	42101	1	093	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
SO2 (trace)	NCore	Continuous	Instrumental	ARM utilizing trace level UV Fluorescence	High sensitivity	42401	2	100	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
Ozone	Ncore/AQI	Continuous	Instrumental	ARM utilizing Ultra Violet photometry	Year-round operation	44201	1	087	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
NO/NOy (trace)	Ncore, SPM	Continuous	Instrumental	ARM utilizing chemiluminescence	High sensitivity external converter mounted at 10m	42600, 42601	1	599	Neighborhood	Population Exposure	10	1/1/2011, moved 10/2/13
PM10 Continuous	SLAMS	Continuous	Instrumental	BAM =Beta Attenuation Monitor Met One BAM - 1020		81102	1	122	Neighborhood	Population Exposure	2	2/20/2007
PM2.5 Continuous	Ncore/AQI	Continuous	Instrumental	BAM =Beta Attenuation Monitor Met One BAM - 1020		88101	3	170	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
PM2.5 Speciated	Ncore	1/3 days	Met One SASS	Energy Dispersive XRF	Analysis by EPA	Vary	5	811	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
PM2.5 FRM	Ncore	1/3 days	R&P PM2.5	Gravimetric	NEW-D	88101	1	145	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
*PM10 - PM2.5 (PM Coarse)	Ncore	1/3 days	R&P	Gravimetric	NEW-S (*NEW-S minus NEW-D is PM Coarse)	86101	1	105	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
TSP-HVAS	Ncore	1/6 days	Hi-Vol-SA/GMW-321-B	Gravimetric	Integrated samplers. Weighed by AMS	11101	1	91	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
TSP - Lead Only	Ncore	1/6 days	Hi-Vol	Atomic Absorption	TSP-HVAS sample collected and sent to InterMountain Laboratory (IML)	14129	1	43	Neighborhood	Population Exposure	2	1/1/2011, moved 10/2/13
Meteorological	Ncore	Continuous		Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure, rainfall and solar radiation		Vary	1	Vary	Neighborhood	Population Exposure	Vary	6/1/1993



Figure 10 - NEW Monitoring Site Map with Major Streets and Major Emission Sources

## NORTHEAST WASTE - 3900 RICHMOND ST. EPA AIRS CODE: 421010048



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210101421	RIVERSIDE MATERIALS INC/ASPHALT PLT	2870 E ALLEGHENY AVE	10.72	2.17	0.00	1.59	0.49	0.28	3.93
4210101551	HONEYWELL/FRANKFORD PLT	4700 BERMUDA ST	66.49	198.93	0.00	68.67	54.77	25.57	112.24
4210102094	DIETZ & WATSON INC/PHILA	5701 TACONY ST	5.49	3.42	0.00	0.51	0.51	0.11	0.37
4210102255	SMITH EDWARDS DUNLAP CO/ALLEGHENY AVE	2867 E ALLEGHENY AVE	0.13	0.17	0.00	0.00	0.00	0.07	3.68
4210103506	PTR BALER AND COMPACTOR/PHILA	2207 E ONTARIO ST	0.02	0.09	0.00	0.01	0.01	0.00	22.66
4210104903	EXELON GENERATING CO/RICHMOND	3901 N DELAWARE AVE	0.06	11.84	0.00	0.34	0.07	3.38	0.01
4210104922	PHILA GAS WORKS/RICHMOND PLT	3100 E VENANGO ST	2.38	5.13	0.00	0.22	0.18	0.02	0.18
4210105003	KINDER MORGAN LIQUIDS TERM/PHILA	3300 N DELAWARE AVE	6.53	6.42	0.00	0.42	0.34	0.04	37.63
4210109513	NORTHEAST WPCP/PHILA	3899 RICHMOND ST	26.40	5.45	0.00	1.58	1.58	5.52	12.09
42101T0034	AMUNEAL MFG CORP/PHILA	4737 DARRAH ST	0.00	0.00	0.00	0.00	0.00	0.00	0.22
TOTAL			118.22	233.62	0.00	73.34	57.96	34.98	193.01



Figure 11 - NEW North Aerial View



**Table 7 - Detailed RIT Information with Monitoring Station Picture**

AMS SITE ID: RIT  
 AQS Site ID: 421010055  
 Street Address: 24th & Ritner Streets  
 Geographical Coordinates  
 Latitude: 39.922517  
 Longitude: -75.186783

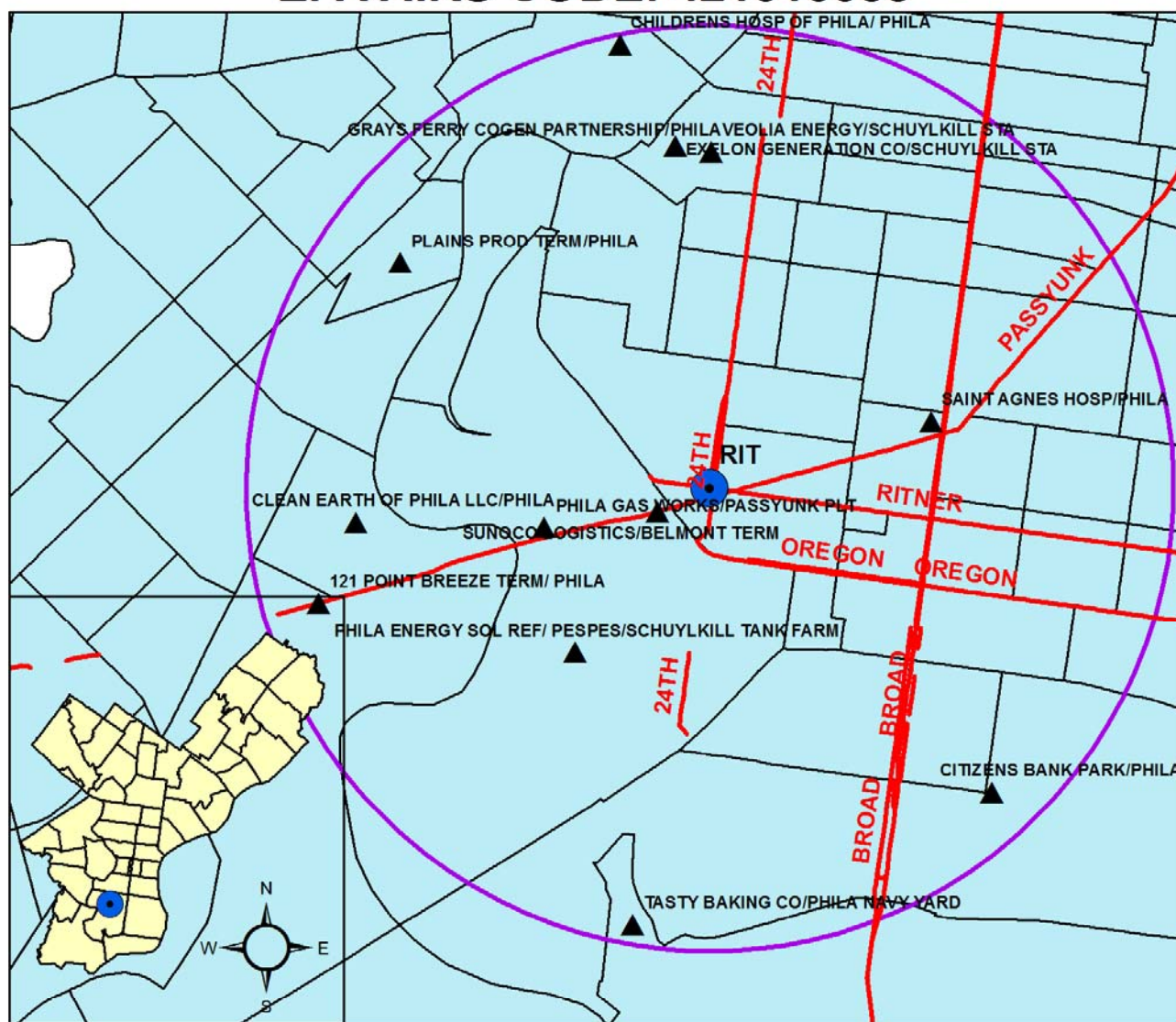


PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
SO2	SLAMS	Continuous	Instrumental	Pulsed Fluorescent		42401	1	100	Neighborhood	Population Exposure	4	11/1/2004
PM2.5 Speciated	SLAMS	Continuous	Met One SASS Teflon	Energy Dispersive XRF	Analysis by EPA	Vary		811	N/A	Regional Transport	N/A	1/15/2011
Metals	SLAMS	1/6 days	Hi-Vol	ICP-MS	Analysis by WV (TSP sampler with quartz)	Vary	1	89	Neighborhood	Other	7	8/31/2004
Carbonyls	Urban Air Toxics	1/6 days	DNPH-Coated Cartridges	HPLC		Vary	2	102	Neighborhood	Highest Concentration	7	Vary
Toxics	Urban Air Toxics	1/6 days	Canister Subambient Pressure	Multi-Detector GC		Vary	4	150	Neighborhood	Highest Concentration	7	11/1/2004
PM2.5 Continuous	SLAMS	Continuous	Instrumental	BAM =Beta Attenuation Monitor Met One BAM - 1020		88101	3	170	Neighborhood	Population Exposure	4	6/1/2011
Meteorological	SLAMS	Continuous		Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure, rainfall and solar radiation		Vary	1	Vary	Neighborhood	Unknown	Vary	4/1/2010



Figure 12 - RIT Monitoring Site Map with Major Streets and Major Emission Sources

## RITNER - 24TH & RITNER STS. EPA AIRS CODE: 421010055



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210101501	PHILA ENERGY SOL REF/ PES	3144 W PASSYUNK AVE	1694.95	1470.74	0.00	482.28	482.28	442.66	680.16
4210101507	SUNOCO LOGISTICS/BELMONT TERM	2700 W PASSYUNK AVE	23.50	9.46	0.00	0.29	0.00	0.10	29.75
4210101517	PES/SCHUYLKILL TANK FARM	3144 W PASSYUNK AVE	0.95	0.21	0.00	0.00	0.00	0.00	85.15
4210102148	CLEAN EARTH OF PHILA LLC/PHILA	3201 S 61ST ST	0.16	0.71	0.00	0.50	0.18	0.76	3.81
4210104904	EXFLON GENERATION CO/SCHUYLKILL STA	2600 CHRISTIAN ST	0.77	5.21	0.00	0.31	0.03	0.01	0.03
4210104921	PHILA GAS WORKS/PASSYUNK PLT	3100 W PASSYUNK AVE	3.45	4.77	0.00	0.36	0.32	0.08	0.26
4210104942	VEOLIA ENERGY/SCHUYLKILL STA	2600 CHRISTIAN ST	0.62	11.80	0.00	0.48	0.48	1.50	0.18
4210104944	GRAYS FERRY COGEN PARTNERSHIP/PHILA	2600 CHRISTIAN ST	4.28	230.50	0.00	23.41	23.41	5.55	8.36
4210105009	PLAINS PROD TERM/PHILA	1630 S 51ST ST	0.00	0.00	0.00	0.00	0.00	0.00	1.94
4210108018	SAINT AGNES HOSP/PHILA	1930 S BROAD ST	1.85	2.27	0.00	0.09	0.00	0.04	0.12
4210108069	CHILDRENS HOSP OF PHILA/ PHILA	34TH & CIVIC CENTER BLVD	25.11	26.45	0.00	2.24	2.24	0.79	2.56
4210110029	121 POINT BREEZE TERM/ PHILA	6310 PASSYUNK AVE	7.65	3.06	0.00	0.00	0.00	0.00	16.73
4210110236	TASTY BAKING CO/PHILA NAVY YARD	4300 S 26TH ST	2.89	3.42	0.00	0.33	0.29	0.00	0.34
4210110147	CITIZENS BANK PARK/PHILA	1001 PAT ISON AVE	5.54	4.01	0.00	0.25	0.25	0.02	1.06
TOTAL			1771.63	1772.62	0.00	610.63	609.48	461.62	830.44



Figure 13 - RIT North Aerial View





**Table 8 - Detailed FAB Information with Monitoring Station Picture**

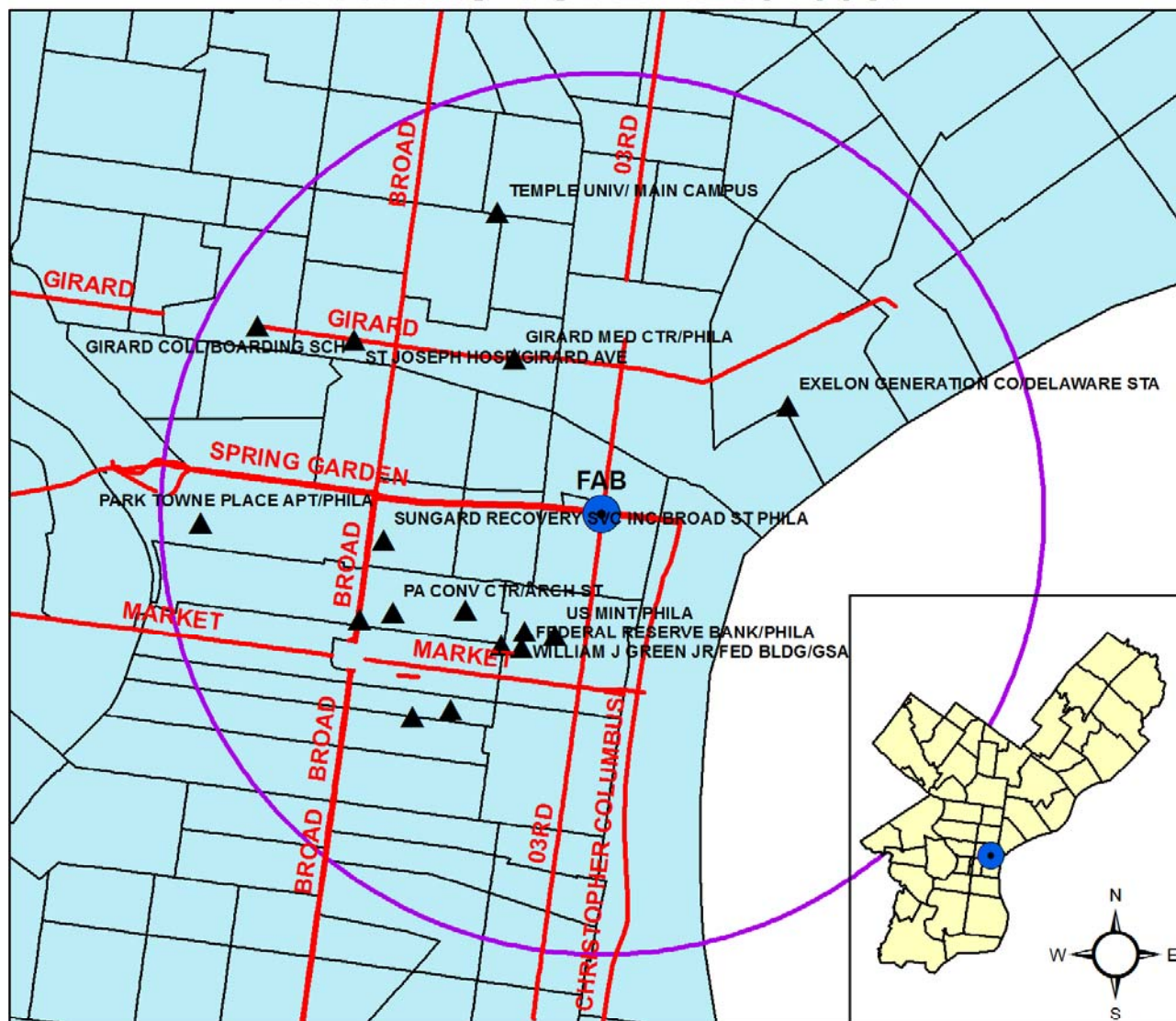
AMS SITE ID: FAB  
 AQS Site ID: 421010057  
 Street Address: 240 Spring Garden Street, 19123  
 Geographical Coordinates  
 Latitude: 39.960291  
 Longitude: -75.142388



PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
PM2.5 Continuous	SLAMS	Continuous	Instrumental	BAM =Beta Attenuation Monitor Met One BAM - 1020		88101	3	170	Neighborhood	Highest Concentration	2	10/1/2012

Figure 14 - FAB Monitoring Site Map with Major Streets and Major Emission Sources

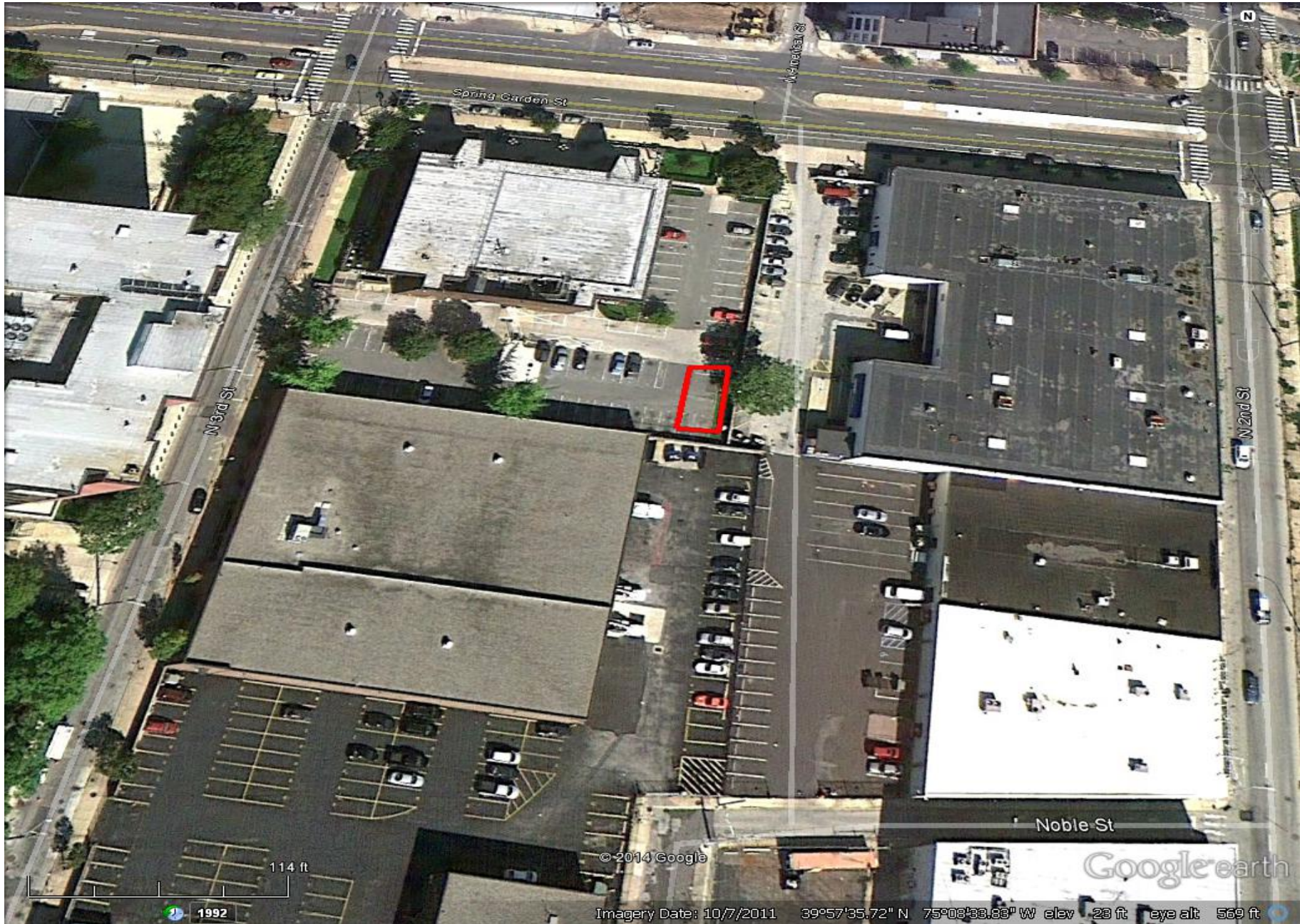
# **FIRESTATION (FAB) - 3RD & SPRING GARDEN STS.** **EPA AIRS CODE: 421010057**



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210101014	VERIZON MKT CTRL OFC/RACE ST	900 RACE ST	0.44	3.76	0.00	0.33	0.33	0.31	0.25
4210103321	SUNGARD RECOVERY SVC INC/BROAD ST PHILA	401 N BROAD ST STE 600	0.03	0.06	0.00	0.00	0.00	0.02	0.01
4210104901	EXELON GENERATION CO/DELAWARE STA	1325 N BEACH ST	1.18	7.62	0.00	0.55	0.05	2.40	0.04
4210104902	VEOLIA ENERGY EDISON/PHILA	908 SANSOM ST	0.61	5.93	0.00	2.81	1.27	9.43	0.05
4210106020	FEDERAL RESERVE BANK/PHILA	100 N 6TH ST	5.43	10.50	0.00	0.77	0.77	0.38	0.57
4210106526	PARK TOWNE PLACE APT/PHILA	2200 BENJAMIN FRANKLIN PKWY	1.89	2.25	0.00	0.07	0.04	0.01	0.12
4210108027	ST JOSEPH HOSP/GIRARD AVE	16TH & GIRARD	0.99	1.45	0.00	0.11	0.00	0.03	0.08
4210108044	GIRARD MED CTR/PHILA	8TH & GIRARD	0.49	1.20	0.00	0.11	0.00	0.84	0.05
4210108901	THOMAS JEFFERSON UNIV/PHILA	11 & WALNUT ST	0.38	1.77	0.00	0.12	0.12	0.12	0.09
4210108905	TEMPLE UNIV/ MAIN CAMPUS	1009 W MONTGOMERY AVE	14.46	21.70	0.00	2.38	2.38	0.29	2.63
4210108918	GIRARD COLL/BOARDING SCH	GIRARD & CORINTHIAN AVE	2.17	2.59	0.00	0.08	0.00	0.06	0.14
4210109703	US MINT/PHILA	151 N INDEPENDENCE MALL E	2.31	1.36	0.00	0.10	0.10	0.01	0.86
4210109723	WILLIAM J GREEN JR FED BLDG/GSA	600 ARCH ST	1.84	2.34	0.00	0.07	0.07	0.02	0.12
4210109726	FEDERAL BUR OF PRISONS/ PHILA COURT	700 ARCH ST	1.34	1.67	0.01	0.05	0.00	0.02	0.09
4210110092	PA CONV CTR/ARCH ST	1101 ARCH ST	2.46	3.42	0.03	0.14	0.14	0.06	0.85
4210110353	PA CONVENTION CTR ANNEX/BROAD ST	111 N BROAD ST	0.85	1.58	0.05	0.08	0.08	0.06	0.09
TOTAL			36.86	69.21	0.10	7.79	5.37	14.04	5.85



Figure 15 - FAB North Aerial View



**Table 9 - Detailed SWA Information with Monitoring Station Picture**

AMS SITE ID: SWA  
 AQS Site ID: 421010063  
 Street Address: 8200 Enterprise Avenue, 19153  
 Geographical Coordinates  
 Latitude: 39.880115  
 Longitude: -75.222784

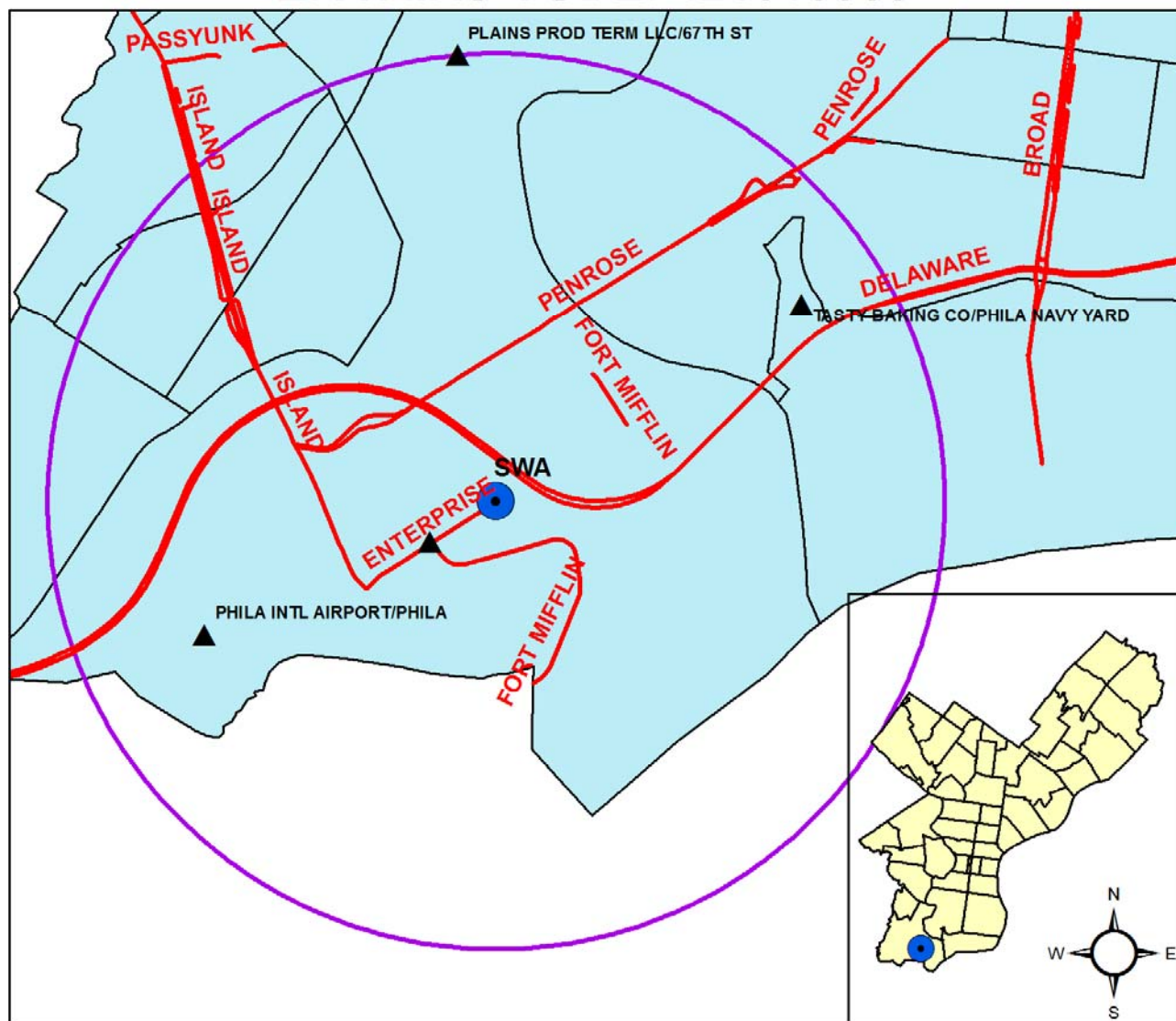


PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
Metals	SLAMS	1/6 days	Hi-Vol	ICP-MS	Analysis by WV (TSP sampler with quartz)	Vary	1	89	N/A	Regional Transport	N/A	9/10/2009
Carbonyls	Urban Air Toxics	1/6 days	DNPH-Coated Cartridges	HPLC		Vary	2	102	N/A	Regional Transport	N/A	9/10/2009
Toxics	Urban Air Toxics	1/6 days	Canister Subambient Pressure	Multi-Detector GC		Vary	3	150	N/A	Regional Transport	N/A	9/10/2009



Figure 16 - SWA Monitoring Site Map with Major Streets and Major Emission Sources

# **PHILADELPHIA AIRPORT - 8200 ENTERPRISE AVE.** **EPA AIRS CODE: 421010063**



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210105013	PLAINS PROD TERM LLC/67TH ST	3400 S 67TH ST	0.37	0.66	0.00	0.06	0.06	0.00	62.12
4210109502	PHILA INTL AIRPORT/PHILA	INDUSTRIAL HWY	9.01	17.20	0.00	1.36	1.36	0.11	0.96
4210109515	PHILA WATER DEPT/STP SW	8200 ENTERPRISE AVE	10.07	3.59	0.00	1.24	1.24	2.23	21.82
4210110236	TASTY BAKING CO/PHILA NAVY YARD	4300 S 26TH ST	2.89	3.42	0.00	0.33	0.29	0.00	0.34
TOTAL			22.34	24.88	0.00	2.99	2.95	2.34	85.25



Figure 17 - SWA North Aerial View



**Table 10 - Detailed TOR Information with Monitoring Station Picture**

AMS SITE ID: TOR  
 AQS Site ID: 421010075  
 Street Address: 4901 Grant Ave. & James St., 19114  
 Geographical Coordinates  
 Latitude: 40.054171  
 Longitude: -74.985166

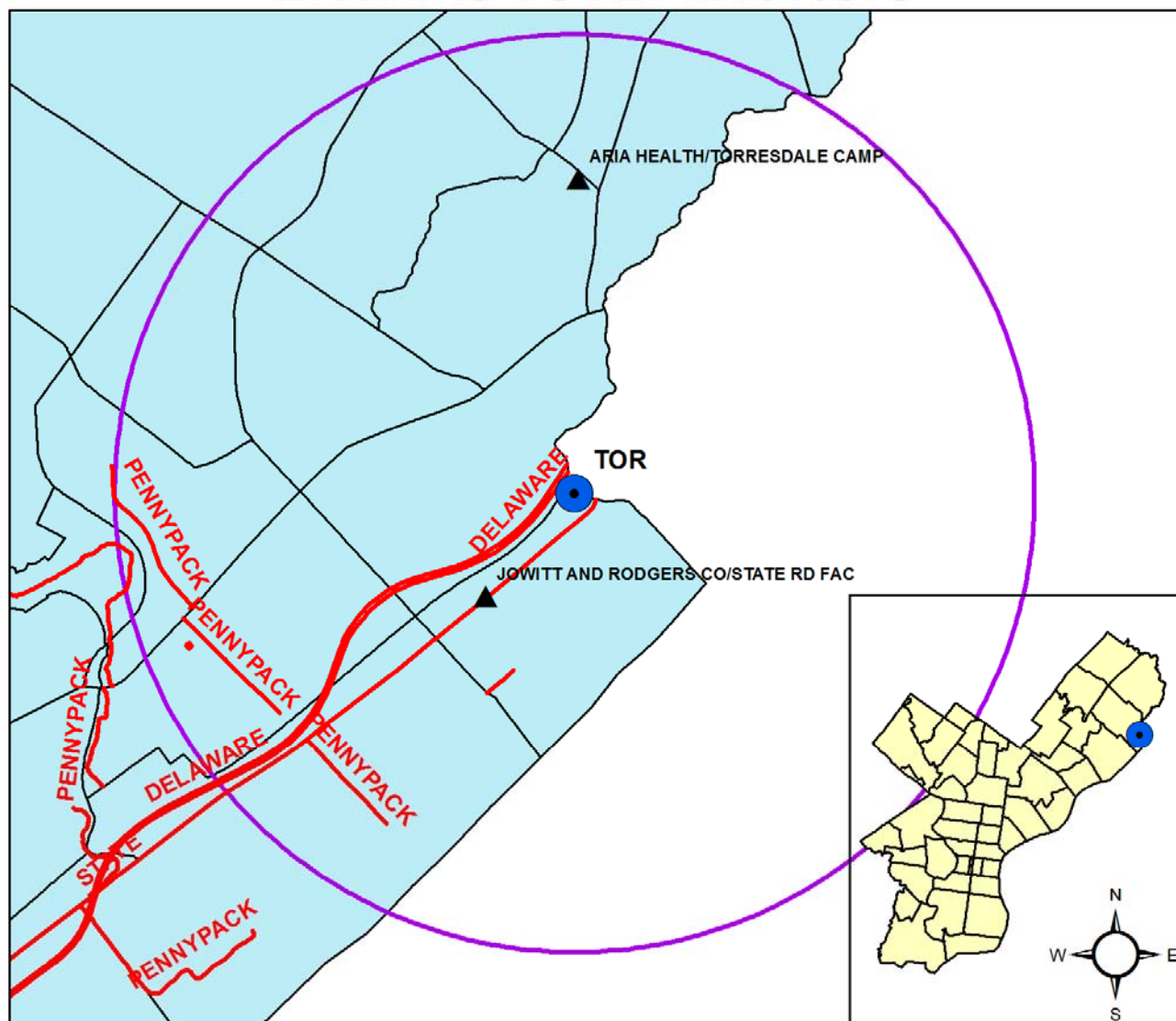


PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
CO	SLAMS	Continuous	Instrumental	Nondispersive infrared		42101	1	93	Microscale	Highest Concentration, Source Oriented	5	1/1/2014
NO2	SLAMS	Continuous	Instrumental	Chemiluminescence		42602	1	99	Microscale	Highest Concentration, Source Oriented	5	1/1/2014
NO	SLAMS	Continuous	Instrumental	Chemiluminescence		42601	1	99	Microscale	Highest Concentration, Source Oriented	5	1/1/2014
NOx	SLAMS	Continuous	Instrumental	Chemiluminescence		42603	1	99	Microscale	Highest Concentration, Source Oriented	5	1/1/2014
PM2.5 Continuous	SLAMS	Continuous	Instrumental	BAM =Beta Attenuation Monitor Met One BAM - 1020		88101	1	170	Microscale	Highest Concentration, Source Oriented	5	1/1/2014
Meteorological	SLAMS	Continuous		Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure, rainfall and solar radiation		Vary	1	Vary	Microscale	Highest Concentration, Source Oriented	5	1/1/2014



Figure 18 - TOR Monitoring Site Map with Major Streets and Major Emission Sources

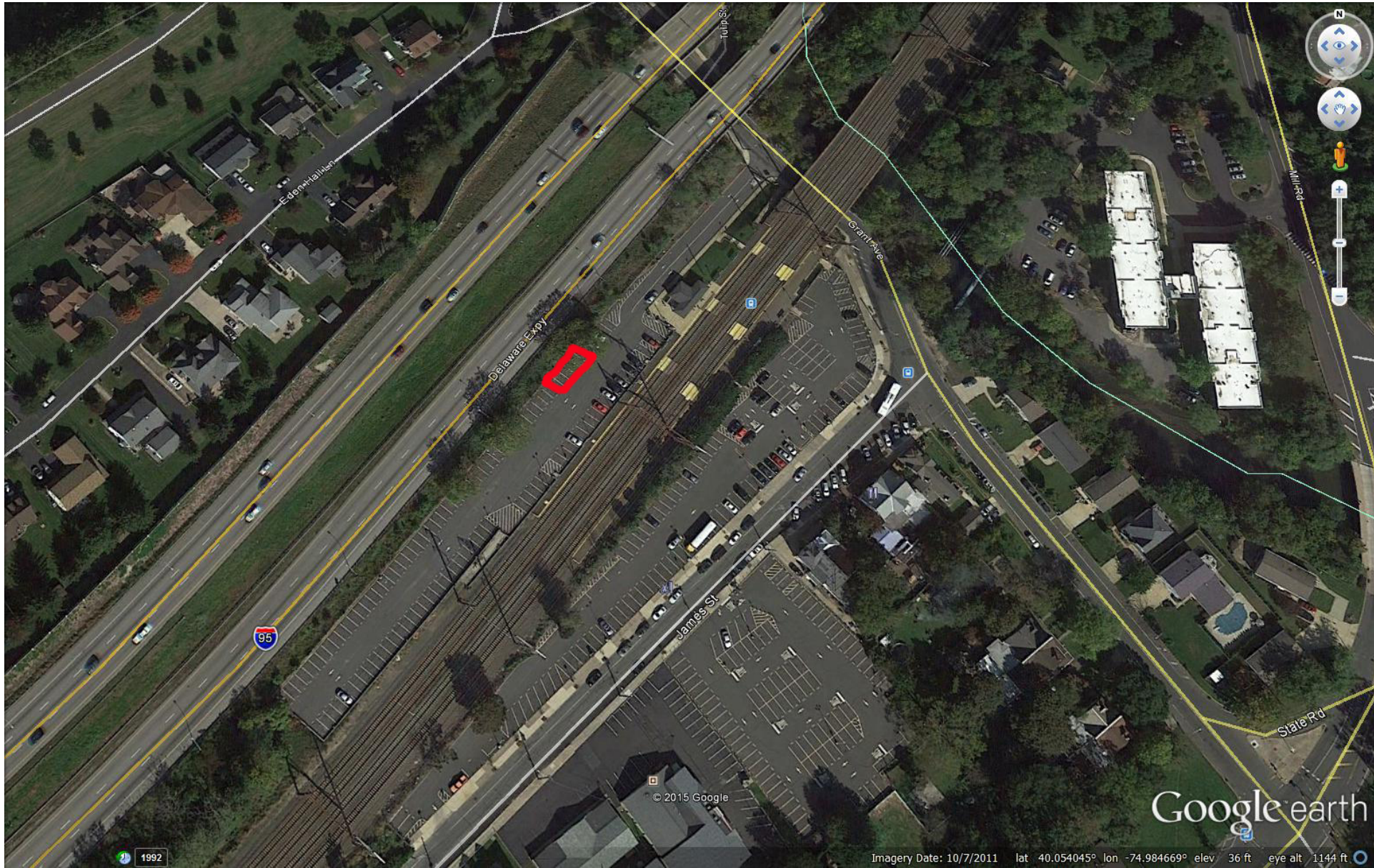
## TORRESDALE - 4900 GRANT AVE. EPA AIRS CODE: 421010075



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210103154	JOWITT AND RODGERS CO/STATE RD FAC	9400 STATE RD	0.03	0.16	0.00	0.01	0.00	0.00	9.56
4210108076	ARIA HEALTH/TORRESDALE CAMP	RED LION & KNIGHTS RD	2.50	4.85	0.00	0.35	0.35	0.13	0.33
TOTAL			2.53	5.01	0.00	0.37	0.35	0.13	9.89



Figure 19 - TOR North Aerial View





**Table 11 - Detailed MON Information with Monitoring Station Picture**

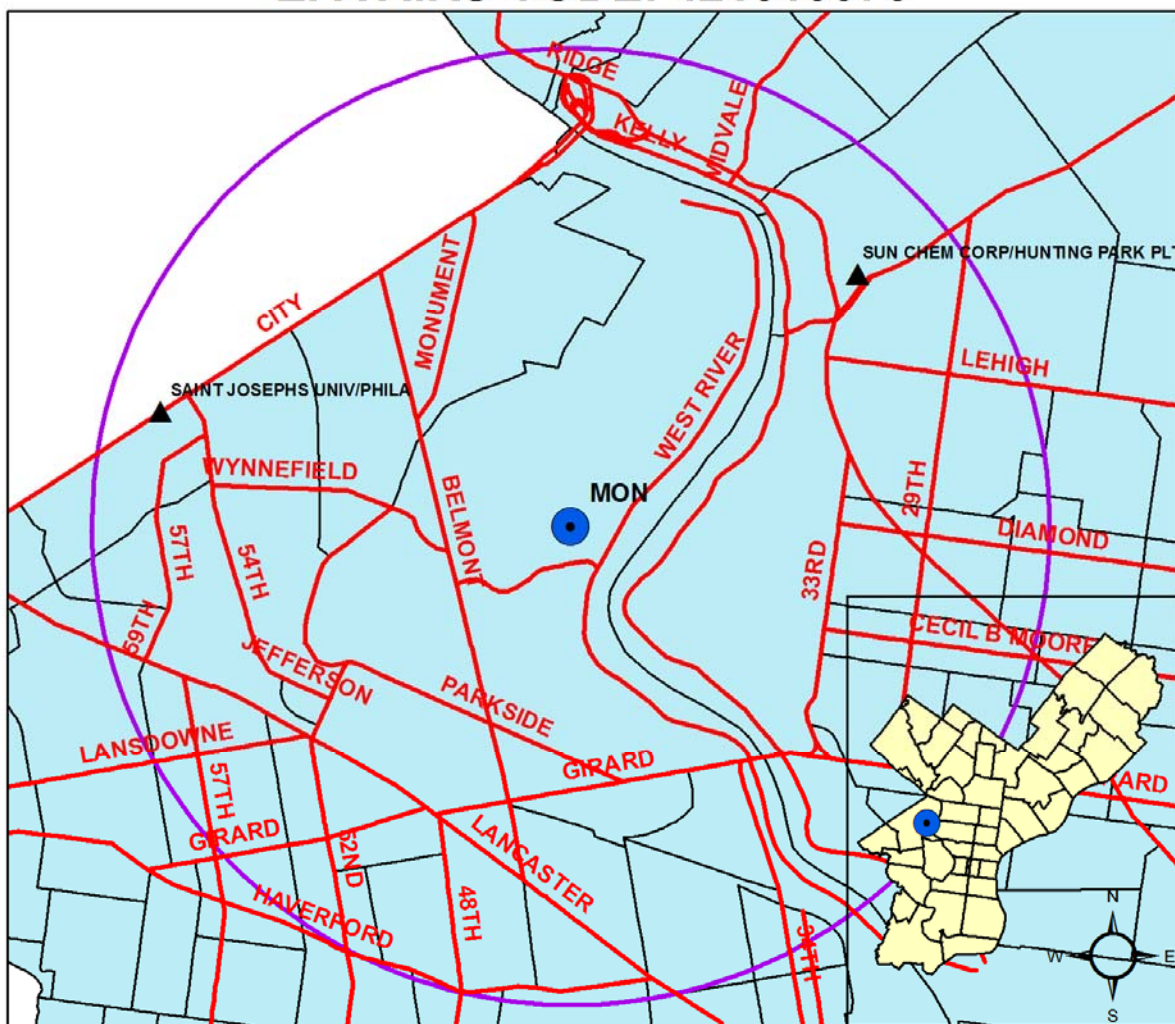
AMS SITE ID: MON  
 AQS Site ID: 421010076  
 Street Address: I-76 & Montgomery Drive, Car Barn OFM Shop 282  
 Geographical Coordinates  
 Latitude: 39.988829  
 Longitude: -75.207205



PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
NO2	SLAMS	Continuous	Instrumental	Chemiluminescence		42602	1	99	Microscale	Highest Concentration, Source Oriented	5	7/1/2015
NO	SLAMS	Continuous	Instrumental	Chemiluminescence		42601	1	99	Microscale	Highest Concentration, Source Oriented	5	7/1/2015
NOx	SLAMS	Continuous	Instrumental	Chemiluminescence		42603	1	99	Microscale	Highest Concentration, Source Oriented	5	7/1/2015
PM2.5 Continuous	SLAMS	Continuous	Instrumental	BAM =Beta Attenuation Monitor Met One BAM - 1020		88101	1	170	Microscale	Highest Concentration, Source Oriented	5	7/1/2015
Black Carbon	SLAMS	Continuous	Instrumental	Teledyne Model 633			1		Microscale	Highest Concentration, Source Oriented	5	7/1/2015
Ultrafine Particulate	SLAMS	Continuous	Instrumental	Teledyne Model 651			1		Microscale	Highest Concentration, Source Oriented	5	7/1/2015
BaP	Urban Air Toxics	1/6 days	Hi-Vol	Thin Layer Chromatography	Analysis by Allegheny County, PA		1	91	Microscale	Highest Concentration, Source Oriented	5	7/1/2015
Meteorological	SLAMS	Continuous		Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure, rainfall and solar radiation		Vary	1	Vary	Microscale	Highest Concentration, Source Oriented	5	7/1/2015

Figure 20 – MON Monitoring Site Map with Major Streets and Major Emission Sources

## MONUMENT - INTERSTATE 76 & MONTGOMERY DR EPA AIRS CODE: 421010076



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210102052	SUN CHEM CORP/HUNTING PARK PLT	3301 W HUNTING PARK AVE	0.24	0.29	0.00	0.09	0.07	0.00	12.52
4210108904	SAINT JOSEPHS UNIV/PHILA	54TH & CITY AVE	2.78	3.65	0.00	0.28	0.28	0.26	0.19
TOTAL			3.02	3.93	0.00	0.37	0.35	0.26	12.71



Figure 21 - MON North Aerial View



**Table 12 - Detailed PHA Information with Monitoring Station Picture**

AMS SITE ID: PHA  
 AQS Site ID:  
 Street Address: 3100 Penrose Ferry Road, 19145  
 Geographical Coordinates  
 Latitude: 39.913176  
 Longitude: -75.185409

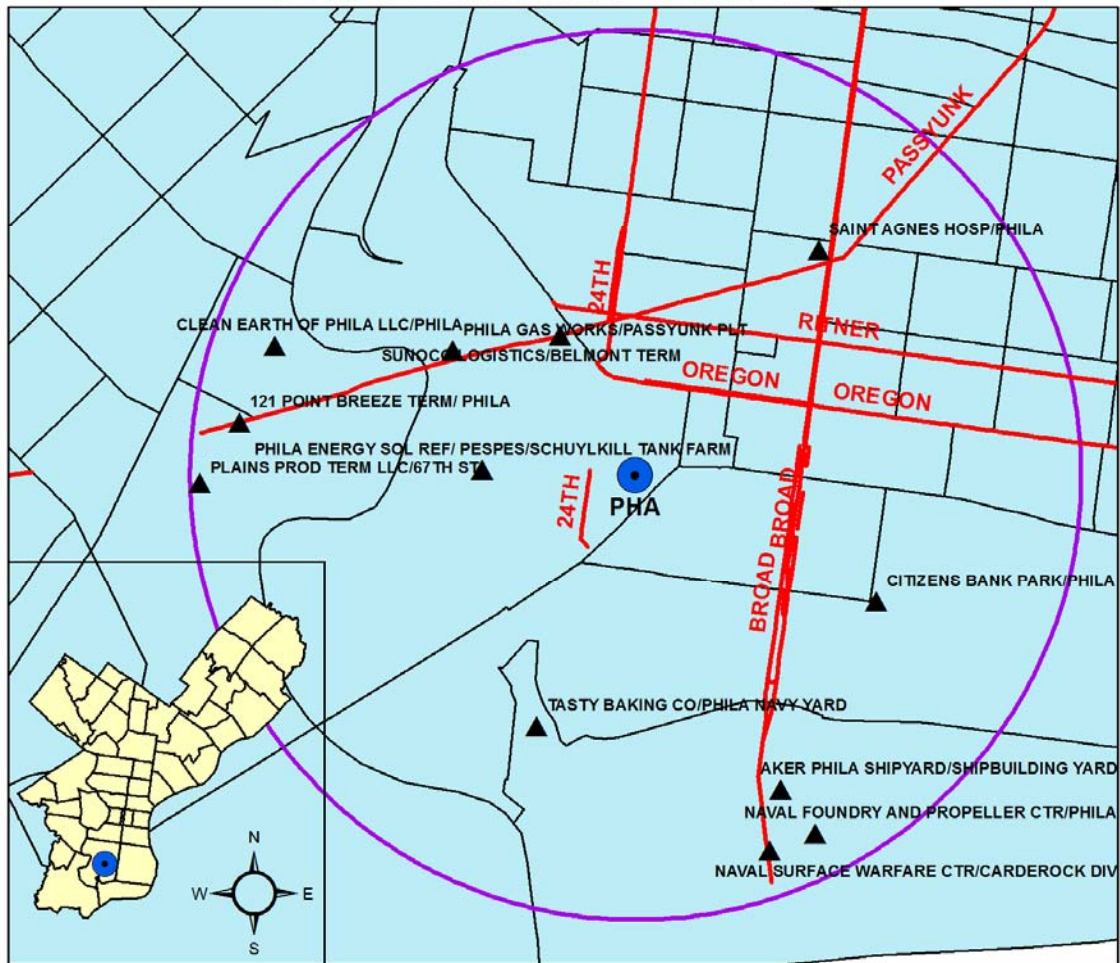


PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
Toxics	Continuous Open Path	Continuous	UV-DOAS	Infrared				Vary	Neighborhood	Population Exposure	2	2/1/2014



Figure 22 - PHA Monitoring Site Map with Major Streets and Major Emission Sources

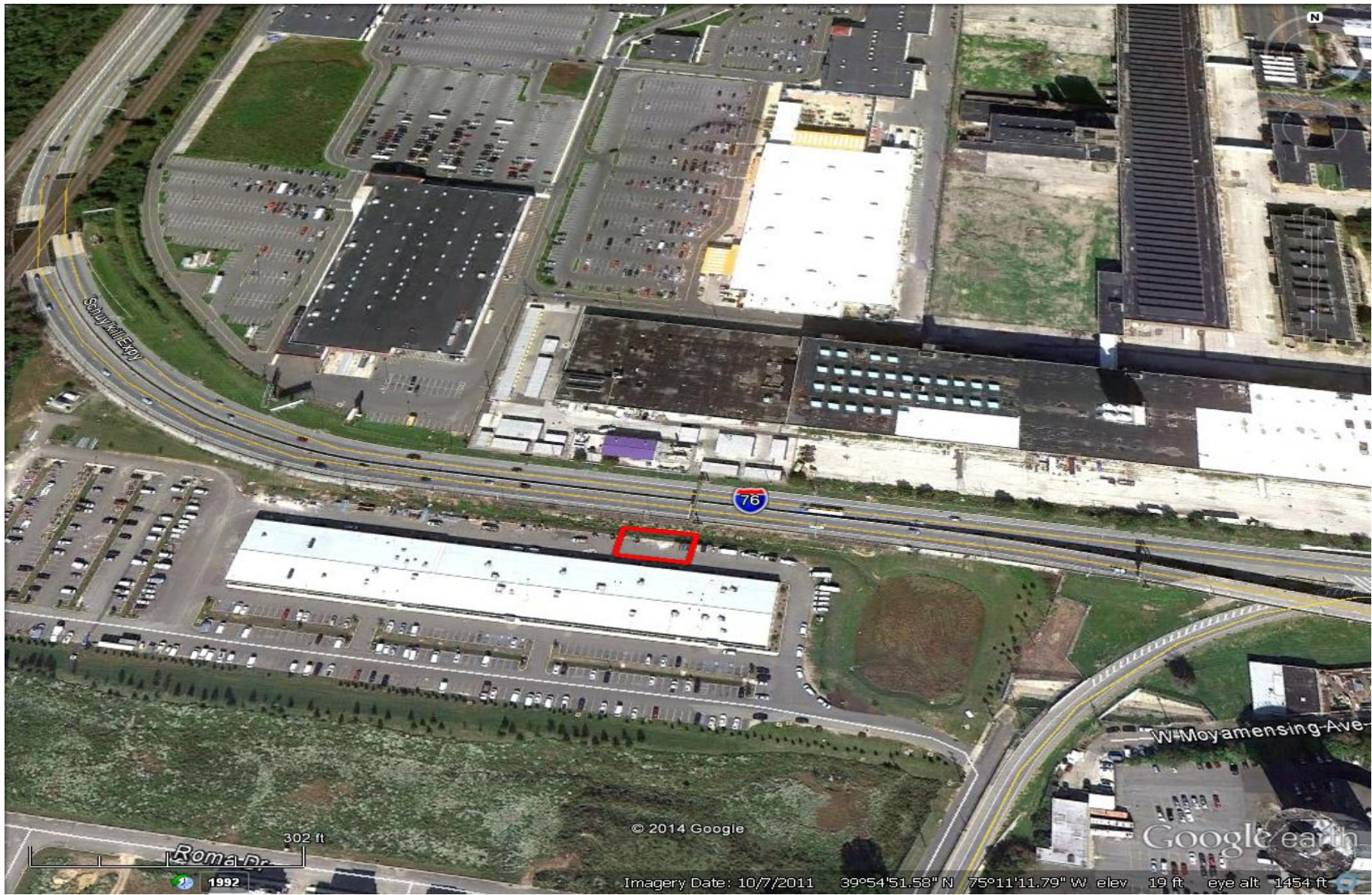
## PHILADELPHIA HOUSING AUTHORITY 3100 PENROSE FERRY RD.



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210101501	PHILA ENERGY SOL REF/ PES	3144 W PASSYUNK AVE	1694.95	1470.74	0.00	482.28	482.28	442.66	680.16
4210101507	SUNOCO LOGISTICS/BELMONT TERM	2700 W PASSYUNK AVE	23.50	9.46	0.00	0.29	0.00	0.10	29.75
4210101517	PES/SCHUYLKILL TANK FARM	3144 W PASSYUNK AVE	0.95	0.21	0.00	0.00	0.00	0.00	85.15
4210101569	AKER PHILA SHIPYARD/SHIPBUILDING YARD	PHILA NAVAL BUS CTR	1.63	0.97	0.00	9.52	9.45	0.01	62.62
4210102148	CLEAN EARTH OF PHILA LLC/PHILA	3201 S 61ST ST	0.16	0.71	0.00	0.50	0.18	0.76	3.81
4210104921	PHILA GAS WORKS/PASSYUNK PLT	3100 W PASSYUNK AVE	3.45	4.77	0.00	0.36	0.32	0.08	0.26
4210105013	PLAINS PROD TERM LLC/67TH ST	3400 S 67TH ST	0.37	0.66	0.00	0.06	0.06	0.00	62.12
4210108016	SAINT AGNES HOSP/PHILA	1930 S BROAD ST	1.65	2.27	0.00	0.09	0.00	0.04	0.12
4210109702	NAVAL FOUNDRY AND PROPELLER CTR/PHILA	1701 KITTY HAWK AVE	0.51	2.64	0.03	11.39	0.00	0.09	1.27
4210109724	NAVAL SURFACE WARFARE CTR/CARDEROCK DIV	5001 S BROAD ST	2.76	25.11	0.00	0.48	0.32	4.64	0.55
4210110029	121 POINT BREEZE TERM/ PHILA	6310 PASSYUNK AVE	7.65	3.06	0.00	0.00	0.00	0.00	16.73
4210110236	TASTY BAKING CO/PHILA NAVY YARD	4300 S 26TH ST	2.89	3.42	0.00	0.33	0.29	0.00	0.34
421010147	CITIZENS BANK PARK/PHILA	1001 PATTISON AVE	5.54	4.01	0.00	0.25	0.25	0.02	1.06
TOTAL			1746.01	1628.06	0.03	505.54	493.15	448.40	943.94



Figure 23 - PHA North Aerial View



**Table 13 - Detailed VGR Information with Monitoring Station Picture**

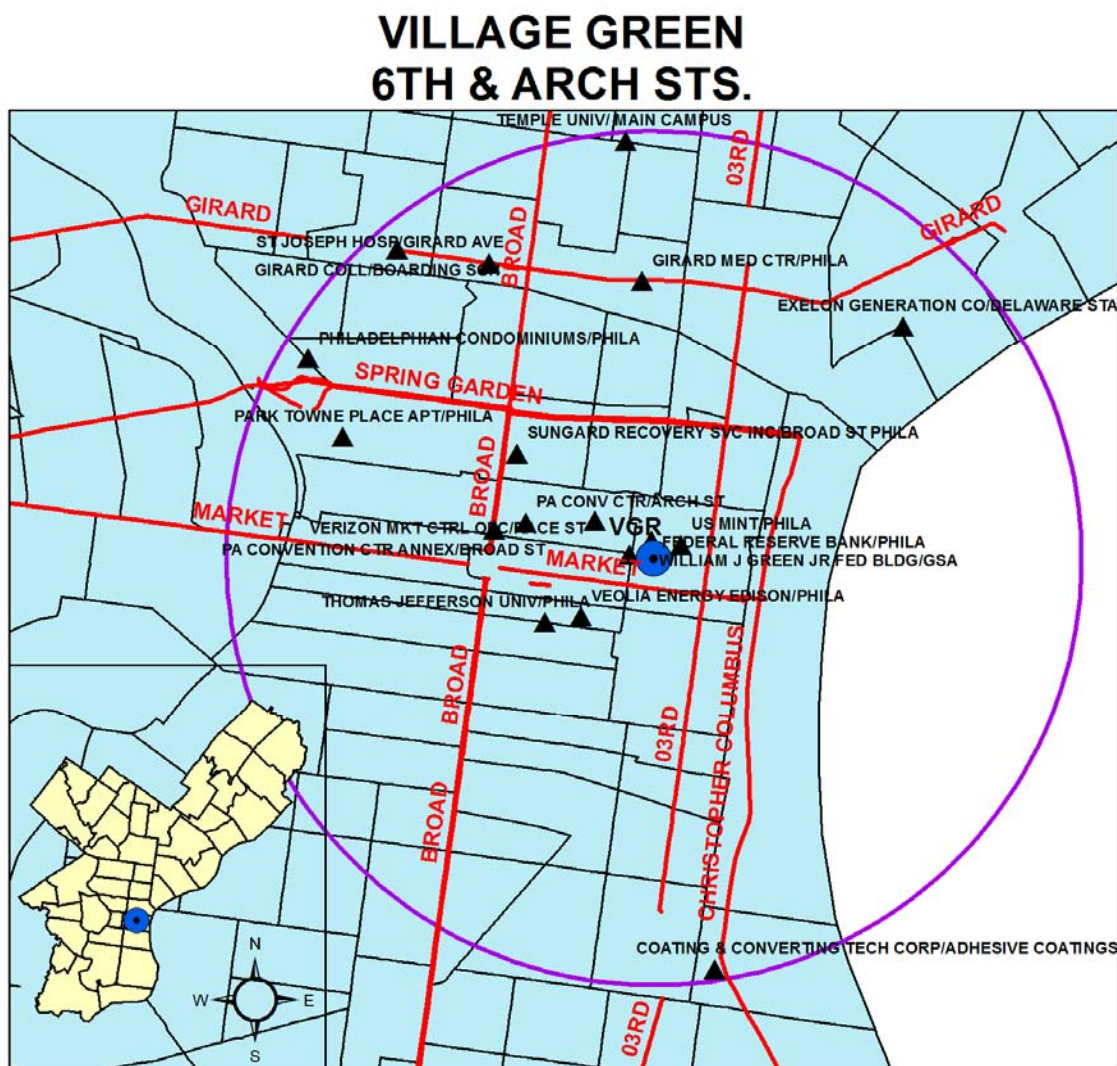
AMS SITE ID: VGR  
 AQS Site ID:  
 Street Address: 6th & Arch Streets  
 Geographical Coordinates  
 Latitude: 39.952608  
 Longitude: -75.149704



PARAMETER	SAMPLING TYPE	OPERATING SCHEDULE	COLLECTION METHOD	ANALYSIS METHOD	COMMENTS	PARAMETER CODE	POC	AQS METHOD	SPATIAL SCALE	MONITORING OBJECTIVE	PROBE HEIGHT (m)	BEGIN DATE
Ozone		Continuous	2B Technologies		Not in AQS							3/15/2015
PM2.5 Continuous		Continuous	Thermo		Not in AQS							3/15/2015
Meteorological		Continuous		wind speed, wind direction, humidity, temperature	Not in AQS							3/15/2015



Figure 24 - VGR Monitoring Site Map with Major Streets and Major Emission Sources



SITE ID	NAME	ADDRESS	2013 EMISSIONS (in tons)						
			CO	NOX	PB	PM10	PM2.5	SO2	VOC
4210101014	VERIZON MKT CTRL OFC/RACE ST	900 RACE ST	0.44	3.76	0.00	0.33	0.33	0.31	0.25
4210103321	SUNGARD RECOVERY SVC INC/BROAD ST PHILA	401 N BROAD ST STE 600	0.03	0.06	0.00	0.00	0.00	0.02	0.01
4210104901	EXELON GENERATION CO/DELAWARE STA	1325 N BEACH ST	1.18	7.62	0.00	0.55	0.05	2.40	0.04
4210104902	VEOLIA ENERGY EDISON/PHILA	908 SANSON ST	0.61	5.93	0.00	2.81	1.27	9.43	0.05
4210106020	FEDERAL RESERVE BANK/PHILA	100 N 6TH ST	5.43	10.50	0.00	0.77	0.77	0.38	0.57
4210106512	PHILADELPHIAN CONDOMINIUMS/PHILA	2401 PENNSYLVANIA AVE	1.48	1.77	0.00	0.05	0.05	0.03	0.10
4210106526	PARK TOWNE PLACE APT/PHILA	2200 BENJAMIN FRANKLIN PKWY	1.89	2.25	0.00	0.07	0.04	0.01	0.12
4210108027	ST JOSEPH HOSP/GIRARD AVE	16TH & GIRARD	0.99	1.45	0.00	0.11	0.00	0.03	0.08
4210108044	GIRARD MED CTR/PHILA	8TH & GIRARD	0.49	1.20	0.00	0.11	0.00	0.84	0.05
4210108901	THOMAS JEFFERSON UNIV/PHILA	11 & WALNUT ST	0.38	1.77	0.00	0.12	0.12	0.12	0.09
4210108905	TEMPLE UNIV/MAIN CAMPUS	1009 W MONTGOMERY AVE	14.46	21.70	0.00	2.38	2.38	0.29	2.63
4210108918	GIRARD COLL/BOARDING SCH	GIRARD & CORINTHIAN AVE	2.17	2.59	0.00	0.08	0.00	0.06	0.14
4210109703	US MINT/PHILA	151 N INDEPENDENCE MALL E	2.31	1.36	0.00	0.10	0.10	0.01	0.86
4210109723	WILLIAM J GREEN JR FED BLDG/GSA	600 ARCH ST	1.84	2.34	0.00	0.07	0.07	0.02	0.12
4210109726	FEDERAL BUR OF PRISONS/ PHILA COURT	700 ARCH ST	1.34	1.67	0.01	0.05	0.00	0.02	0.09
4210110092	PA CONV CTR/ARCH ST	1101 ARCH ST	2.46	3.42	0.03	0.14	0.14	0.06	0.65
4210110353	PA CONVENTION CTR ANNEX/BROAD ST	111 N BROAD ST	0.85	1.58	0.05	0.08	0.08	0.06	0.09
4210110114	COATING & CONVERTING TECH CORP/ADHESIVE COATINGS	80 E MORRIS ST	0.23	0.27	0.00	0.02	0.02	0.00	15.73
TOTAL			38.87	71.25	0.10	7.86	6.46	14.07	21.68



Figure 25 - VGR North Aerial View



## **Appendix A**

### **Wind Rose Plots**

Figure A. 1 - Philadelphia Wind Rose Plots (2006-2014)

